

THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD



Portland Cement Association's New Research and Development Laboratories

JUNE, 1950

YOU said it!



"built like a Mack Truck"

● The expression "Built Like A Mack Truck" was not coined by us. It worked its way into America's everyday language because for 50 years Mack trucks have been an accepted symbol in the public mind for something extra strong and extra rugged.

To truck users in excavating and quarry work, in pit and strip mining, in oil field hauling — "Built Like A Mack Truck" means even more. It means trucks that are built to build profits... designed to give advantages offered by no other make. Powerful Thermodyne and diesel engines! Massive heat-treated frames! Rubber Shock Insulators! Hydraulic Power Steering! Air Assist Clutch! Mack's matchless Balanced Bogie and Power Divider.

All are Mack advantages that assure power and brawn for the heaviest loads... easy handling for fast loading and unloading... flotation and traction for the most slippery mud or sand.

Find out what "Built Like A Mack Truck" can mean on your particular job—in greater profits through greater output... greater economy.

Be Profit-Wise

Modernize with



8018

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Research keeps
B.F. Goodrich
FIRST IN RUBBER



B. F. Goodrich cord conveyor belt

*Gives 2 to 6 times greater impact resistance,
troughs better, lasts longer*

IN the cord plies of a B. F. Goodrich belt each cord is completely surrounded by rubber—no cross threads tie them together. These parallel cords are completely insulated from one another by rubber, free to "give" lengthwise and crosswise when an impact occurs. Thus the rubber can distort temporarily to distribute and absorb shocks that would damage a stiff, unyielding carcass. This augmented impact cushion means better belt service, longer belt life.

Cord belts trough better—Cord belts carry the load with less belt damage, less material "spill." Even

thick, narrow cord belts trough naturally. And because they trough better, cord belts keep centered on the idlers, sustain less damage, require less maintenance. Longer centers, higher lifts can be used. Creasing action between idlers (as in a fabric-type belt) is eliminated.

Cord belts last longer, reduce costs—The better impact cushion of cord construction resists cuts and gouges. A transverse cord "breaker" floated above and across the main cord section helps cushion impact, keeps the cover from stretching beyond elastic limits, and provides better adhesion between cover

and carcass. With each cord completely sealed in rubber, this BFG belt resists the effects of acid materials, moisture, mildew.

Cord belts for tough jobs—If your belts must take severe impact on loading or "over the idlers," cutting and gouging at the loading chute, exposure to moisture and acid materials, heavy loads with long centers and high lifts, you need BFG cord belts. Your local distributor will show you how they can save you money. The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.

B.F. Goodrich
RUBBER FOR INDUSTRY



Rock Products



JUNE, 1950

THE INDUSTRY'S RECOGNIZED AUTHORITY

VOL. 53, No. 6

Bror Nordberg
Editor

Nathan C. Rockwood
Editorial Consultant

This Month

We Hear	71
Editorial—A Planned Program for Industry Research	75
Rocky's Notes—Accounting for Varieties of Igneous Rocks	77
Labor Relations Trends	79
The Personal Side of the News	81
Industry News	85
Hints and Helps	88
New Machinery	90
Portland Cement Association's New Research Laboratories	
The \$3,000,000 facilities just dedicated have complete and up-to-date equipment for research on cement and concrete, manned by enlarged staff of experts	
Processing Granite Rock for Dam	94
Hydro-electric project dam in California has novel equipment features and design. Vacuum dewatering wheel used to dry manufactured sand as a control for proportioning concrete	
Rotary Drill Speeds Quarry Output	102
Thornton quarry of Material Service Corp. uses a rotating bit kept under continuous pressure by hydraulic power to drill blast holes	
Producing a Variety of Silica Products	108
Standard Silica Corp. uses pebble mills and conical mills in the production of silica flour	
Hydrated Dolomitic Lime Produced in Small Plant	110
Gravel Plant Features Removal of Impurities	113
Consolidated Rock Products Co., solved the problem of removing sticky clay inclusions at its Orange County operation by installing a conical scrubber and dewatering unit	
Crushing Practice and Theory	114
Manufacturing Cement in Vertical Shaft Kiln	118
Thermodynamics of Lime Manufacture	
Part II. Economics of fuels for rotary kiln operation, the combustion process, and the various factors influencing efficient operation	
Excavating Sand by Perforated Bucket	121
Commonwealth Sand & Gravel Co., Richmond, Va., has had successful experience with use of a perforated-type dragline bucket	
Reduction of Sand Sizes in Stockpiles	122
Research indicates that fineness modulus of sands stored in stockpiles will vary because of loss in particle sizes with time	
Combined Stationary and Portable Operation	125
Sampling Florida Dune Sands	126
Obtaining samples of sand for test facilitated by use of a drive-pipe sampling method and the application of a water jet device	
First Rotary Lime Kiln for Finland	127
Effective Merchandising of Dry Packaged Concrete	132
Supply Company Adds Ready-Mix Facilities	135
Major Installation of Culvert Pipe	169
Stone Producer Expands Ready-Mix Operations	171
Big Rock Stone & Material Co., Little Rock, Ark., has up-to-the-minute plant which features central dispatching control	

Walter B. Lenhart, Associate Editor
L. David Minsk, Associate Editor
M. K. Smith, Assistant Editor
J. Sedlack, Assistant Editor

Contributing Editors

Victor J. Asbe
Dr. F. O. Anderegg
M. W. Loving
James A. Barr, Jr.

Home Office

Morgan K. Cottingham, Ad. Manager
H. M. Goodenow, Dir. of Circulation
Mary A. Whalen, Circulation Service
M. S. Hendricks, Dir. of Research
C. M. Hancock, Production Manager
C. P. Teats, Field Representative

District Offices

Eastern Area—Richard Y. Fuller, Manager; John F. Lockitt, Assistant, 522 Fifth Ave., New York 18
Tel. Murray Hill 2-7888.

Central Area—R. P. Keine, Manager, Hanna Bldg., Cleveland 15, Tel. Main 1-4362.

Midwest Area—E. H. Hickey, Representative, 309 W. Jackson Blvd. Chicago 6, Tel. Harrison 7-7890.

Western Area—L. C. Thann, Manager, 309 West Jackson Blvd., Chicago 6, Tel. Harrison 7-7890.

Pacific Area—Duncan Scott & Co. Mills Bldg., San Francisco 4, Tel. Garfield 1-7950. In Los Angeles 5, 2978 Wilshire Blvd., Tel. Dunkirk 8-4151.

London, England—Harold F. Charles, Managing Director, Maclean-Hunter, Ltd., Sun Life of Canada Bldg., Trafalgar Square, London, S.W.1

ROCK PRODUCTS is published monthly by MACLEAN-HUNTER Publishing Corporation, 309 West Jackson Blvd., Chicago 6, Illinois; Horace I. Hunter, President; E. R. Gaulty, Vice President; J. L. Frazier, Secretary. Copyright, 1950. Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill. post office under the act of Mar. 3, 1879. Additional entry at Milwaukee, Wis. ROCK PRODUCTS is indexed regularly by Engineering Index, Inc.

SUBSCRIPTION INFORMATION

Subscription Price—United States and Possessions, Canada one year, \$2.00; two years, \$3.00; three years, \$4.00. Pan American, one year, \$4.00; two years, \$7.00; three years, \$10.00. All other foreign, one year, \$6.00; two years, \$12.00; three years, \$15.00. Twenty-five cents for single copies. Indexed in the Industrial Arts Index. Canadian subscriptions and remittances may be sent to Canadian funds to ROCK PRODUCTS, P. O. Box 100 Terminal "A," Toronto, Canada. To Subscribers—Date on wrapper indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

3 Basic SIDE-DUMPS

DOORLESS PAN • LIFT DOOR • DROP DOOR

All three types are available in truck bodies and trailers, offering a choice in capacities suitable to meet every requirement in off-highway transportation of earth, rock and ore. EASTON truck bodies and trailers are used in service with all makes of commercial or off-highway trucks or truck tractors.



DOORLESS PAN. The famous EASTON doorless pan trailers and truck bodies are used for efficient, low cost shuttle service between shovel and crusher in quarries throughout the world. Usually dumped by EASTON automatic electric overhead hoist. Hydraulic jacks may be used.

LIFT DOOR. Extra large capacity EASTON lift door trailers and truck bodies are establishing remarkable performance records in mine and quarry service. Dumped by overhead hoist.



Investigate, now! For prompt attention please write directly to:
EASTON CAR & CONSTRUCTION COMPANY

Easton, Pennsylvania



EASTON BD-11116H
Side-Dump Truck Body
Automatic Drop Door
Capacity, 16 tons

Every Load Pays Off!

It's another great EASTON truck body. Built to haul more, load faster, dump faster and last longer. Look at these big savings...

extra payload The box-shaped body, especially designed for versatile earth moving service, packs maximum payload into minimum overall dimensions.

extra speed The body shape provides a big, easy target for fast shovel loading. Side dumping lets you roll up, dump and roll on with no time lost for backing and turning. The door operation is completely automatic—rugged and amazingly smooth.

extra strength Dependable EASTON know-how gives these bodies extra long life *without extra weight*. They're built for years of punishing service.

*Shown with an Autocar Diesel.
Same body available in
other capacities and in heavier
construction for hauling
rock and ore*



EASTON
Side-Dump
TRAILERS • TRUCK BODIES



1. MULTI-USE

Gives lowest cost per foot of hole when full increment of drill steel can be drilled and when control and reconditioning of bits are correct.



2. CARBIDE INSERT

For drilling extremely hard and abrasive ground, small holes, extra deep holes. Drillers spend more time drilling—less time changing bits.



3. ONE-USE "SPIRALLOCK"

To use where reconditioning is impractical or undesirable. Lowest unit cost. "Spirallock" union holds bit on dependably—permits easy removal.

Only TIMKEN® offers all 3 rock bit types...and a complete Rock Bit Engineering Service!

THERE'S one best bit for every drilling job. And Timken can give it to you. Only Timken makes *all three* rock bit types—multi-use, carbide insert, and one-use. And the Timken Rock Bit Engineering Service helps you select the type, size, and shape to give the drilling performance your job demands—whether it's lowest bit cost, lowest cost per foot of hole, greatest possible drilling speed, or other desired advantage.

FREE BOOKLET: Timken's newest rock bit booklet gives full information on all three types of Timken removable rock bits. Shows full line of bits in actual-size photographs, with detailed descriptions. Write on your company letterhead to The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



TIMKEN

... your best bet for the best bit
... for every job

Start with a
REAL ROCK SHOVEL
*...and you'll be
sure to finish the job!*



If you have a real Rock Shovel you'll never have to worry about output in any kind of digging. Start with a real Rock Shovel and you'll be sure to finish the job.

Northwests are proved Rock Shovels with advantages a Rock Shovel should have.

The Northwest Dual Independent Crowd utilizes force other independent crowd shovels waste. Cast Steel Machinery Bases and Cast Steel Machinery Side Frames are better able to take the strains of tough digging. The Cushion Clutch relieves all parts under power from shock loads and increases machine life and cable life. The "Feather-Touch" Clutch Control increases output, assuring easier operation and a *feel of the load* that makes it easier to handle the big ones. These are just a few of the many advantages you won't find in other shovels—just a few of the features that make money in the heart of the Rock Job. Put a Northwest in the *Key Spot* and be sure of the kind of service that makes one out of every three Northwests sold a repeat order.

NORTHWEST ENGINEERING CO., 1504 Field Bldg., 135 South LaSalle St., Chicago 3, Ill.

NORTHWEST

Convertible for any Mining Material Handling or Excavation Problem



HOW TO Handle a Variety of Jobs on a Single, Lower Investment

—USE THE Allis-Chalmers HD-5G and Tracto-Shovel Interchangeable Attachments*

You can load sand, rock, gravel — materials of all kinds — from pits or stockpiles, build haul roads, handle any excavation, dig and backfill trenches, plow snow or load it, cut costs on dozens of other jobs — all with this standard machine and one or more specially designed attachments. Investigate this all-around, year-around money-saver . . . NOW!



The Most Advanced Tractor in its Power Class

BIG WORK CAPACITY—This completely new smaller tractor has big tractor design, balance and stamina . . . surprises users everywhere with its performance. As owners say, "You've got to see it to believe it."

JUST THE RIGHT SIZE—to efficiently handle a wide variety of jobs. Has 11,250 lb. of properly balanced weight (tractor bare) . . . 40.26 drawbar hp. provided by the smooth-running, economical, 2-cycle GM Diesel engine—every down stroke a power stroke!

NEEDS LESS GREASING THAN AN AUTOMOBILE—Instead of hitting a dozen or more grease fittings every shift, you lubricate only one fitting every

two weeks, two other fittings every five weeks (based on 40-hour weeks). And you operate a full 1,000 hours before replenishing lubricant in truck wheels, track idlers and support rollers.

SIMPLE TO SERVICE—All adjustments are unusually accessible. Major assemblies are removable without disturbing unrelated parts — engine, clutches, transmission, etc. There's less downtime — more time working . . . labor and repair costs are reduced.

BUILT-IN SAFETY AND CONVENIENCE—Easier steering and shifting with convenient controls, full vision. Cushioned seat, wide arm rests. Operator gets more done because it's easier to do more!

Write for literature or ask your Allis-Chalmers dealer for a demonstration!

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

*These 14 Tracto-Shovel Attachments

Can be
Interchanged
in but a
Few Minutes

1 cu. yd.
Standard
Bucket



1/4 cu. yd.
Narrow Bucket



2 cu. yd. Light
Materials
Bucket



1 cu. yd.
Rock Bucket



Teeth For
All Buckets



Heavy-duty
Bulldozer
Blade



Heavy-duty
Angledozer
Blade



Lift Fork
(4,000 lb.
lifting
capacity)



Crane Hook
(15,000 lb.
lifting
capacity)



V-type
Snowplow



Trench Moo



Drag Bucket



Tine Fork



Rock Fork



The usefulness of the HD-5 Tractor is further widened by other allied equipment: 2-wheel scrapers, rippers, rollers, cranes, skid loaders, canopies, winches and log carts.

For Greater Production . . . For Easier Operation . . . For Simplified Servicing

Let's be SPECIFIC about reduction crusher Efficiency

We believe that Traylor TY Reduction Crushers are superior to other secondary fine crushers in several ways. We believe that they are *more economical* to operate . . . that they are *more dependable* in heavy-duty, continuous service . . . that they produce a better, more *uniform product*.

Now let's look inside a Traylor TY to see how it achieves this outstanding operating efficiency.

**TRAYLOR'S
CURVED CONCAVES
AND BELL HEAD**
produce better aggregate
at less cost per ton

LOWER POWER COST

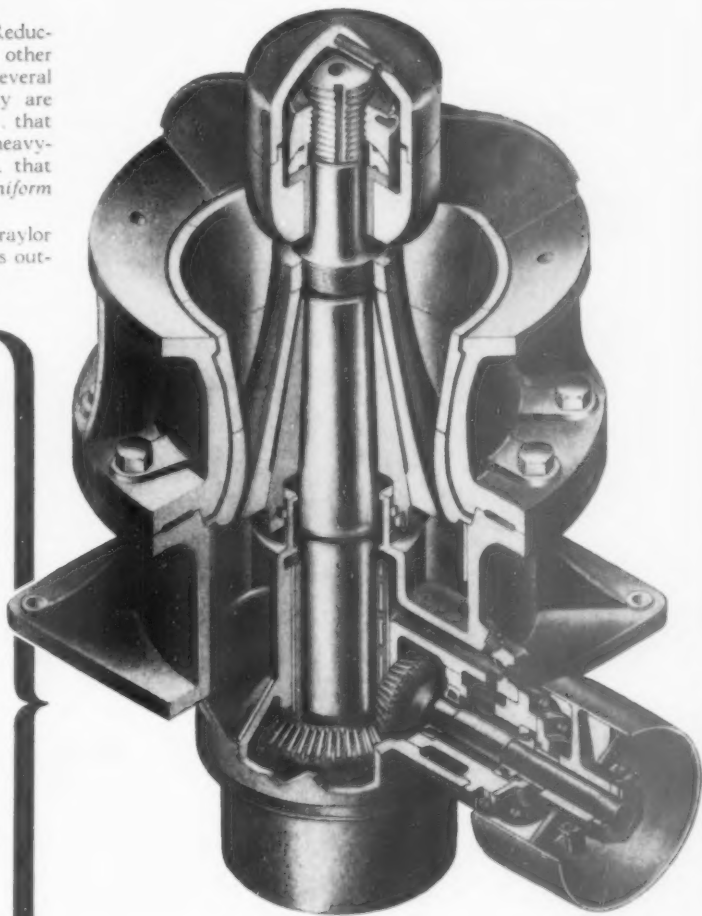
Traylor's curved concaves and bell head apply power as a *direct* crushing force. The eccentric motion of the bell head exerts power *directly* counter to the curved surfaces of the concaves. This stops lifting and churning of material . . . cuts down power loss . . . reduces power costs per ton.

GREATER DEPENDABILITY

Traylor's curved concaves and bell head *eliminate choking and packing*. Each succeeding feed zone is of greater capacity than the preceding zone. As the material passes thru the crusher it has free fall from each stage of reduction to the next. Costly downtime is avoided . . . lost production is saved.

HIGHER QUALITY PRODUCT

Since there is no choking or packing . . . *no lifting and churning* . . . material flows evenly thru the crushing chamber of a Traylor TY Reduction Crusher. This reduces the percentage of waste fines. The curved crushing surfaces produce a more uniform product at less cost per ton.



WRITE FOR FREE BOOKLET

Many other outstanding design features account for the low maintenance costs and dependable service of a Traylor TY Reduction Crusher. They are fully described in our new Bulletin #5112. Write for your free copy today.

TRAYLOR ENGINEERING & MANUFACTURING CO.

154 Mill St., Allentown, Pa.

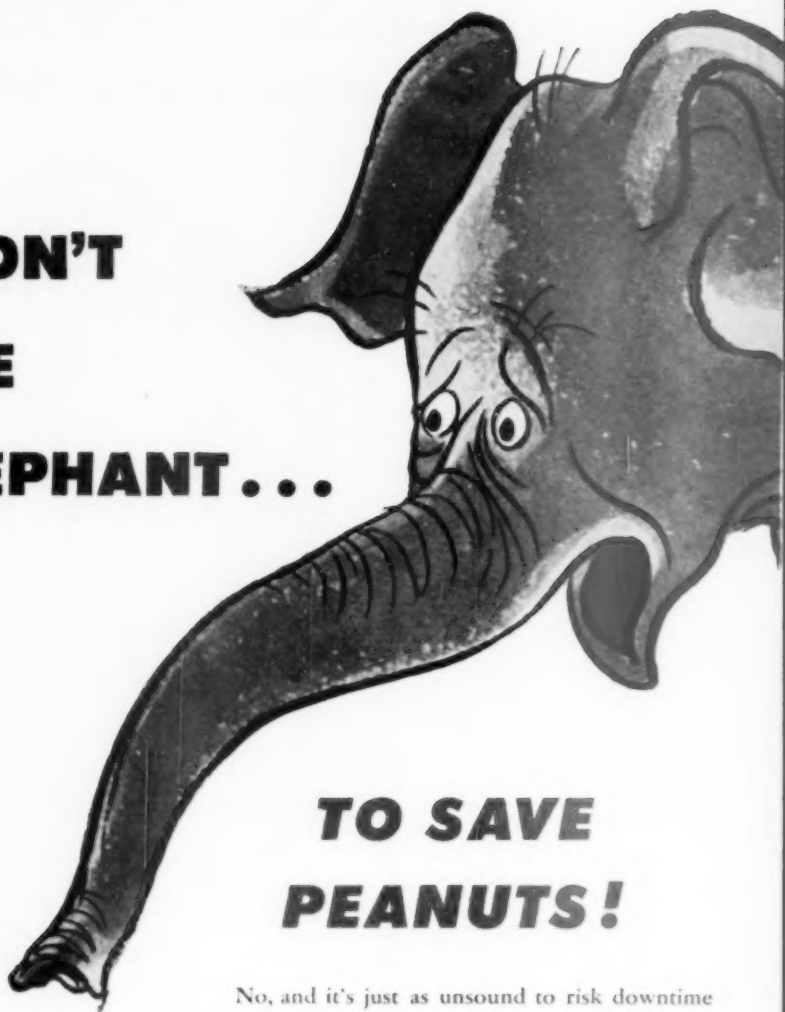
Sales Offices: New York, N. Y., Chicago, Ill., Los Angeles, Calif.
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P. Q.

Traylor

Rotary Kilns, Coolers and Dryers
Grinding Mills • Crushing Rolls
Jaw, Reduction and Gyratory Crushers

A "TRAYLOR" LEADS TO GREATER PROFITS

**YOU
WOULDN'T
STARVE
AN ELEPHANT...**

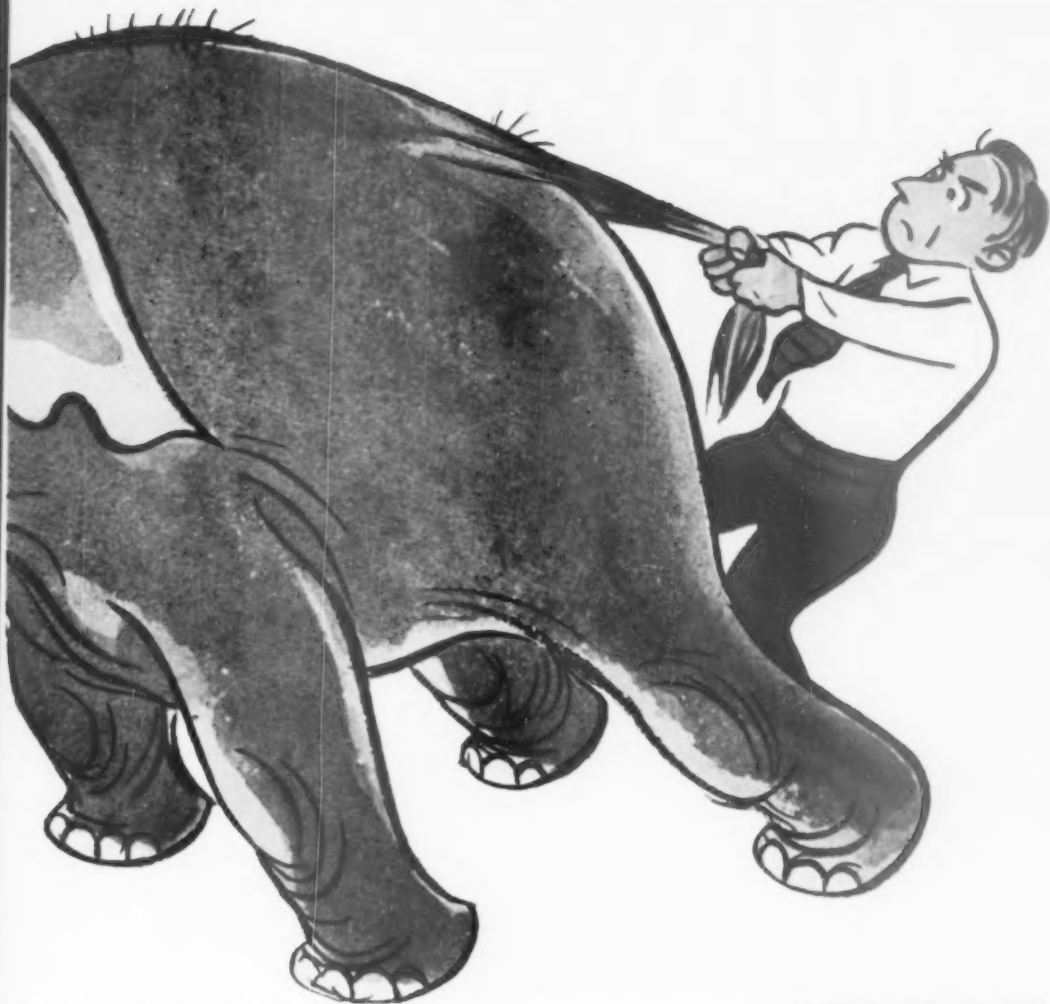


**TO SAVE
PEANUTS!**

No, and it's just as unsound to risk downtime and damage to expensive machines for the sake of saving "peanuts" on lubricant costs! For lubrication is not just "oils and greases"... it's also knowledge of your machines, the right lubricants to use, and where and when to use them.

That's why you save in so many ways with *Socony-Vacuum Correct Lubrication*... a custom-made program of lubrication for your particular equipment and operating conditions that pays off in greater efficiency, faster work-progress, lower maintenance costs, and—ultimately—lower lubrication costs.

For the *genuine* savings of Correct Lubrication, call your Socony-Vacuum Representative.



Here's Practical Help for Contractors . . .

Socony-Vacuum gives you . . .

- Help on all maintenance problems.
- Tested lubrication schedules.
- Advice on correct application of lubricants.
- One source of supply.
- Simplified inventory—with . . .

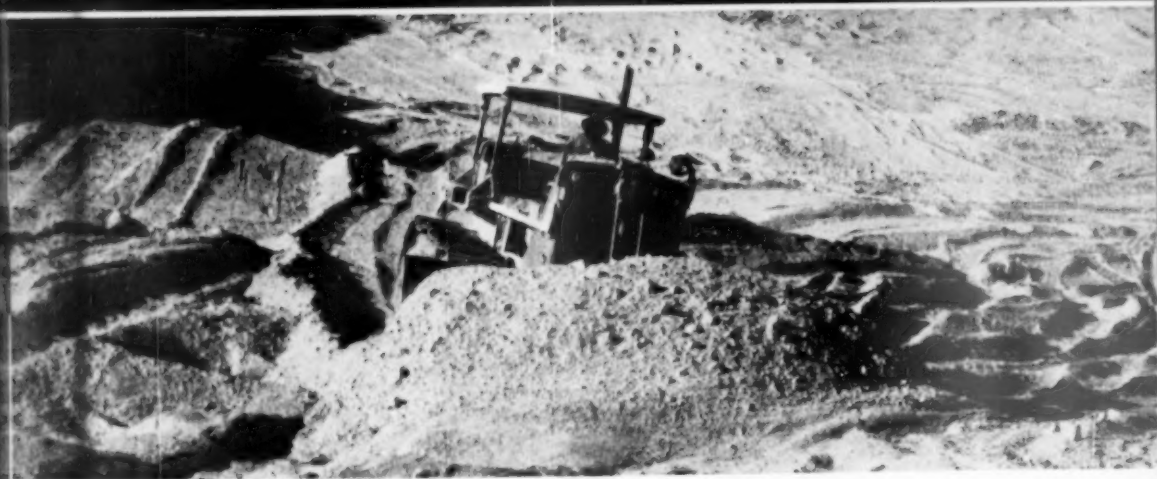
1. **DELVAC OILS**—for gasoline, automotive-Diesel engines.
2. **MOBILUBE GX**—for all enclosed gears — manually operated transmissions and final drives.
3. **MOBILGREASE MP**—for all chassis parts and engine accessories.



CORRECT LUBRICATION *for Contractors*

THE FLYING RED HORSE COMPANIES: SOCONY-VACUUM OIL CO., INC.
MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

The Tractor that makes 'dozing pay off



It's hard to beat "Caterpillar" Diesel Tractors for back-breaking pit and quarry 'dozing jobs. They mean top results with the power, capacity, and dependability they offer. Like the one above, cleaning up in an open-pit mine.

"Caterpillar" Diesel Tractors slug away at the job tirelessly. They have the right horsepower for the job load. And this means they work quickly and without fuel waste — keep everlastingly at it to save you money by continuous, big-production performance under the most severe service. These big yellow machines are precision-built to keep going 24 hours a day without "soldiering" on the job. And remember that *absenteeism* of machines through down time is more costly than lost man-power time!

When the tractor behind the tough-tooled, maneuverable blade is "Caterpillar"-built, you've got a hard-to-beat combination for any 'dozing assign-

★ "Caterpillar" Diesel D8 Tractor, with matching No. 8A Dozer, cleaning away waste at the open-pit mine of the Dicalite Division of the Great Lakes Carbon Corporation, near Basalt, Nevada. This unit slugs away at the job whether the Nevada temperature is zero in the sun or 110 in the shade. These "Caterpillar" units are ideal for high-power, low-cost stripping, road construction, pusher loading of scrapers, and general utility and cleanup work.

ment. Your "Caterpillar" matched team is backed up by a one-manufacturer, one-dealer combination that saves you time and money. And "Caterpillar" double-covers your emergency problems with a network of spare-parts depots spotted throughout the nation to give you emergency service on all replaceable items — current and non-current!

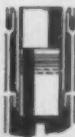
Your "Caterpillar" dealer is the man to see for further details. He welcomes competitive questions because "Caterpillar" machines thrive on comparison. Precision-built of quality materials, they're in there swinging day after day and year after year.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

LOOK UNDER THE HIDE for the qualities that pay off in tractor performance and long life... you'll find them in every "Caterpillar" detail. For example:



Hard Chrome-Faced Compression Rings are standard on all models of "Caterpillar" Diesel Tractor Engines—increasing life and performance at critical point of engine design.



Alloy Iron Wet Type Cylinder Liners are "Hi-Electro" hardened—giving exceptionally long life. Wearing surface is chemically treated for proper break-in.



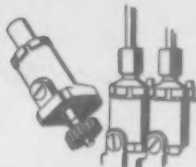
Solid Aluminum Alloy Connecting Rod and Main Bearings are exclusively "Caterpillar." Advantages: low rate of wear; fine heat-transfer characteristics; high corrosion resistance.



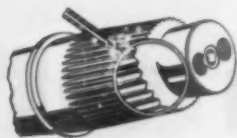
Air-Cooled "Lube" Oil. Air cooling lowers oil temperatures—reducing carbon, minimizing gum formations, and adding to the efficient serviceable life of working parts.



Independent Starting Engine of exclusive "Caterpillar" design gives safe-and-sure starts at all times, and allows the Diesel to build up full oil pressure before starting.



"Caterpillar"-Built Fuel Injection System is perfectly matched for "Cat" Engines. Pumps and valves require no adjustments, and are replaceable in the field—like spark plugs.



Tapered Splines—specially developed by "Caterpillar"—lock sprockets securely to shafts. So effective have they proved that the principle is similarly applied to other vital parts.



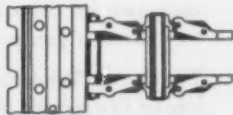
"Hi-Electro" Hardened Final Drive Gears. Teeth are three times harder after treatment and gear life is further boosted by the favorable compressive stress this process supplies.



Bellows Seals are self-aligning, self-adjusting and self-lubricating—keep oil in, dirt and water out without need for take-up adjustment or periodic attention.



Correct Track Alignment, both vertically and laterally, is assured with this rigid roller frame. Heavy diagonal brace and widely spaced bearings add life to tracks and rollers.



Counterbored Track Links—to provide a tighter, better sealed joint and greater bearing surface between bushings and track pins. Extra assurance of long life in abrasive soils!



Hour Meter to give user the facts on tractor performance and life. Hour meters have always been standard on "Cat" Engines because "Caterpillar" has nothing to hide.

CATERPILLAR
DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT



Vanilla or

You get the best of both with

There is a size and type of Cedarapids aggregate producing plant for every job. Send for catalogs.

Bulletin MT — Master Tandem
Bulletin Unit-2 — Unitized Plant
Bulletin JT-3 — Junior Tandem
Bulletin PS-1 — Pitmaster
Bulletin Rock-1 — Rock-It
Bulletin SPP-1 — Single Pass
Bulletin Hawk-1 — Hawkeye

Cedarapids

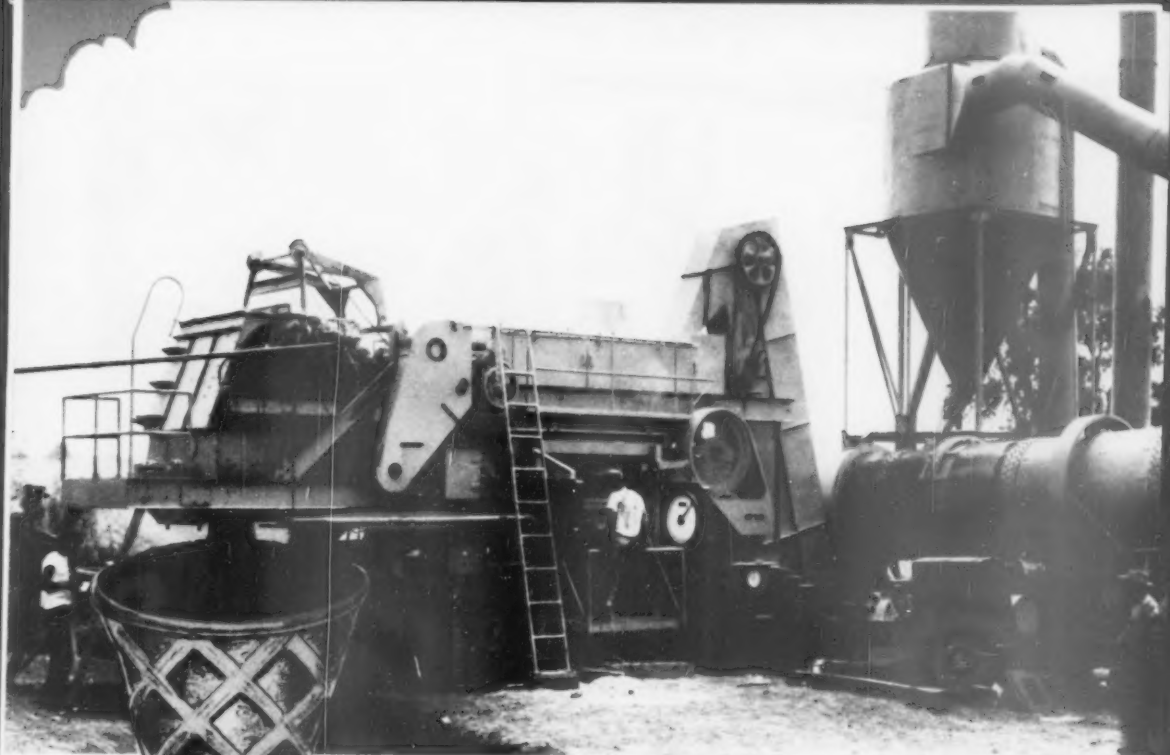
Built by
IOWA

WHETHER you use your aggregate as just plain vanilla aggregate or chocolate covered for black top, you'll be way ahead if you produce it with Cedarapids equipment.

The Junior Tandem, illustrated, is the leader of the long line of Cedarapids portable crushing and screening plants known everywhere for big volume production, low operating costs and minimum maintenance. Smooth, balanced coordination of screens, crushers and conveyors . . . quick adaptation to a wide variety of jobs . . . fast, easy set-up and take-down—all add up to more profitable operation—50 tons an hour, 250 or more—crushed gravel, aglime or roadstone—whatever the specifications or volume—your Cedarapids distributor has the plant to fit your needs. See him today.

THE IOWA LINE of Material Handling Equipment Includes:

ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • ROCKET ELEVATORS • VIBRATOR AND REVOLVING SCREENS
• UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • TRAPS • PORTABLE POWER CONVEYORS • PORTABLE STONE AND
GRAVEL PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • HAMMERMILLS • DRAG
SCRAPER TANKS • WARMING PLANTS • SOIL COMPACTION UNITS • STEEL TRUCKS AND TRAILERS • KUBIT IMPACT BREAKERS



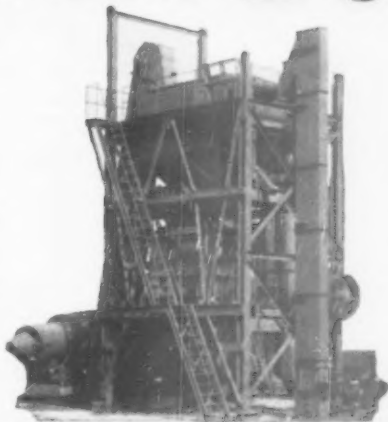
Chocolate?

Cedarapids Equipment

A CEDARAPIDS bituminous mixing plant is just the thing to chocolate mix your aggregate for low cost black top.

The mix from the Model FA, shown above, will meet the strictest specifications as well as your own demands for low cost. The FA is our most portable batch type plant but its 25 cu. ft. pugmill assures plenty of capacity for handling most of your jobs.

On all Cedarapids plants, perfectly matched screens, batchers, pugmills, elevators and driers provide a smooth, steady flow of thoroughly mixed batches. If your specifications are not too strict a Cedarapids Volumetric type plant may be the answer—either a Patchmaster or the Master Mixer. Write for bulletin today.

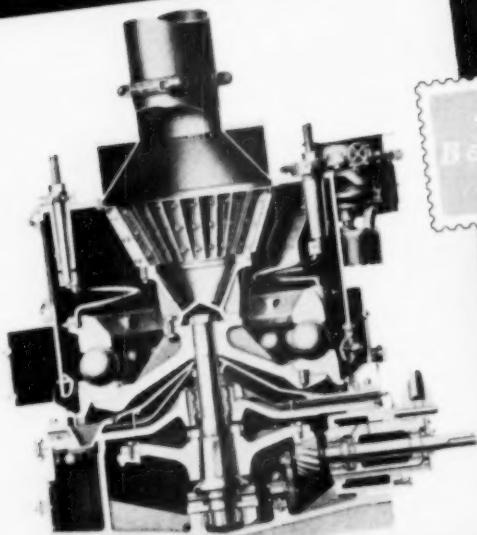


MODEL E—Here's the plant for your big black top jobs. Available in 2,000, 3,000, and 4,000 lb. batch sizes. They combine big volume with accurate batching, thorough mixing—low cost and easy portability. Also 1,000 lb. Model A stack-up plant. Ask for Bulletin AP-12.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

**BUILT
FOR**



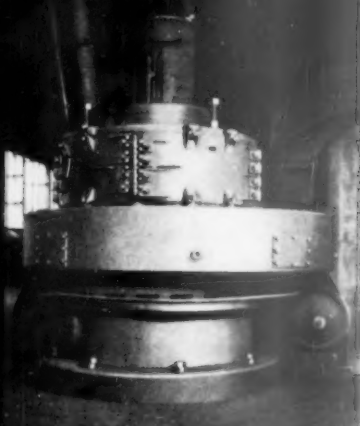
*A product of
B & W Engineering
for economy*


HIGHLY EFFICIENT KILN FIRING

B & W Type E Pulverizers have an outstanding record for economical rotary kiln firing, with wet or dry coal of widely varying grades. Their ball-bearing grinding principle . . . rugged construction . . . trouble-free operation . . . automatic pressure lubrication . . . delivery of uniformly fine coal to burners at closely controlled rates, regardless of wear of grinding elements . . . high availability . . . low power consumption . . . all are contributing features . . . all service-proved in over 200 installations.



**BABCOCK
& WILCOX**





**Switch
to this new**

**PLASTIC Reinforced
PRIMACORD
in place of Wire Countered.**

Field tested for over a year — where the going is toughest — the new PLASTIC Reinforced Primacord showed itself far superior to Wire Countered Primacord. Yet it costs no more!

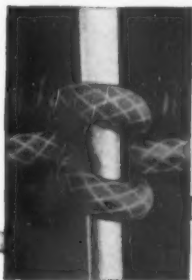
Reinforced with rayon yarn, it is stronger and lighter in weight. Finished with a smooth, tough seamless plastic covering, it is waterproof and resistant to acids encountered in mineral ores. It does not become brittle or crack in cold weather, nor is it affected on hot summer days, and it is not a conductor of electricity.

PLASTIC-Reinforced Primacord is your best bet in all deep, wet holes—in preloading, pipe line river crossings, horizontal holes, marine work, coyote tunnels and sleeper shots for seismograph work.

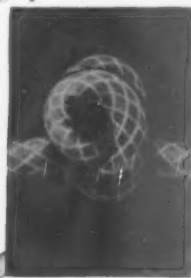


Plastic Reinforced Primacord is recommended for "down" lines where you formerly used Wire Countered Primacord.

1. To make the most effective hookup, use a simple clove hitch in the ground line, as shown in these three photographs.



3. Pass the Plastic Reinforced Primacord through this hole and draw the knot up tight.



2. The twin loops have been folded over to form a hole.

THE ENSIGN BICKFORD COMPANY • SIMSBURY, CONN.

PRIMACORD-BICKFORD DETONATING FUSE • SAFETY FUSE SINCE 1836

"DEPENDABLE... on Burning Sand or Mountain Pass!"



HIS OUTFIT IS JUST FINISHING A DESERT PROJECT WHERE THE TEMPERATURE REACHED 110°. NEXT WEEK HE MOVES TO A ROCKY MOUNTAIN PASS - HIGHEST ELEVATION, 10,057 FEET. THAT'S WHY HE USES GARDNER-DENVER PORTABLES. THEY KEEP WORKING ANYWHERE.



Gardner-Denver Portable Compressors are available in sizes from 105 to 500 cu. ft. actual capacity.

Ask the men who go after the big jobs—the tough jobs! They'll tell you that two-stage Gardner-Denver Portable Compressors assure full capacity air at *any* altitude—under *all* weather and temperature conditions. Completely

water-jacketed cylinders eliminate cold, unlubricated starts—require no "cooling off" periods even in torrid desert heat. For better compressor performance—all the time—choose Gardner-Denver!



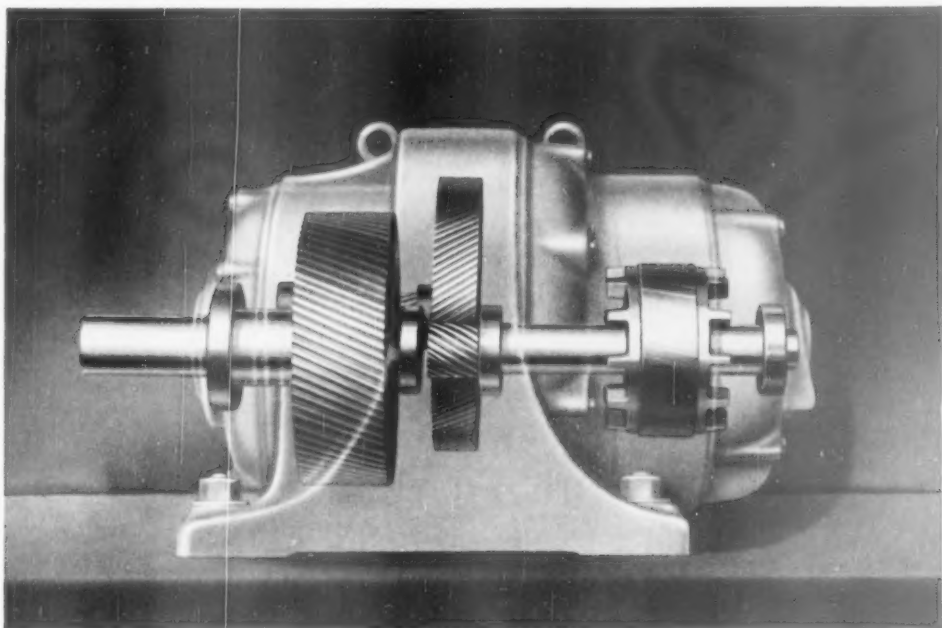
GARDNER-DENVER SINCE 1859

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver (Canada) Ltd., Toronto, Ontario

ADDING MULTIPLIED TORQUE TO ROCK PRODUCTS PLANTS

AMPLE TORQUE, DEVELOPED BY INTERNAL GEARING, GIVES BETTER POWER

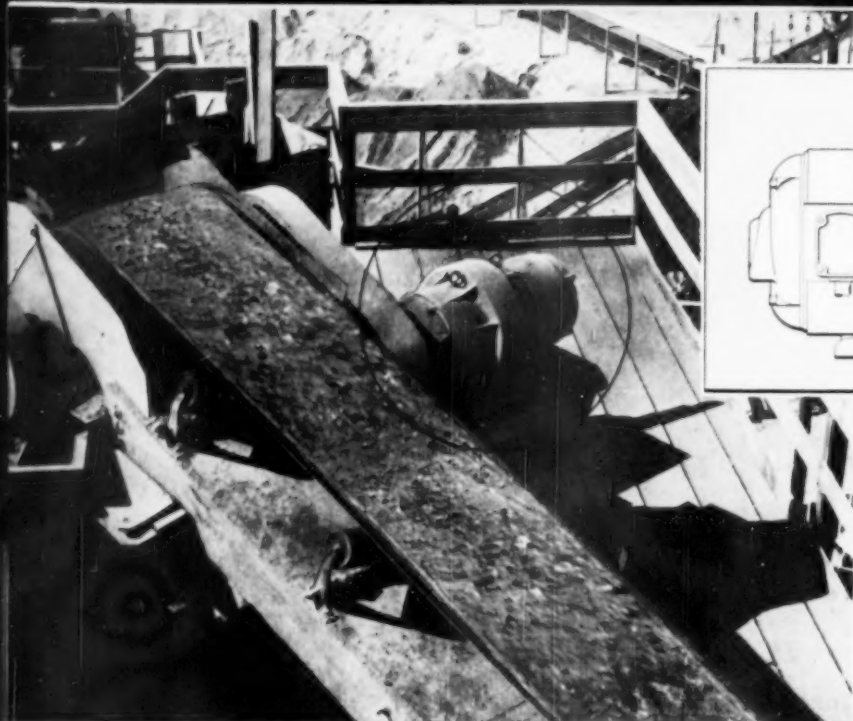


Diaphanous view of U. S. Syncrogear Motor

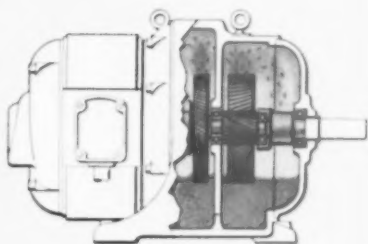
THE GEARED MOTOR WITH PYRAMIDAL STABILITY

ROCK PRODUCTS PLANTS require electric drives of high torque, low speed output. The solution is found by the ideal combination of an efficient, compact, high speed motor with torque multiplying, built-in gearing. Successful design must provide for multiplied torsional forces; stresses must be supported by a non-yielding, permanently rigid member; gears must precisely match forever; all castings must maintain their original accuracy. In the *U. S. Syncrogear* these recognized engineering fundamentals are combined. The rugged *pyramidal* gear pedestal provides structural stability. Gears are produced by U. S. Motors for industrial gear motor service. Electrical design is coordinated to give optimum over-all performance. 10 to 10,000 rpm.

U. S. SYNCROGEAR MOTOR



Top of a rock conveyor at 100 ft. level powered by 30 hp U. S. Syncrogear Motor



*The motor that
is designed for
heavy drag loads
where plenty of
torque is needed.*

Below:
U. S. Syncrogear, 25 hp operating
conveyor from pit to 50 ft. level.

U. S. SYNCROGEAR MOTOR

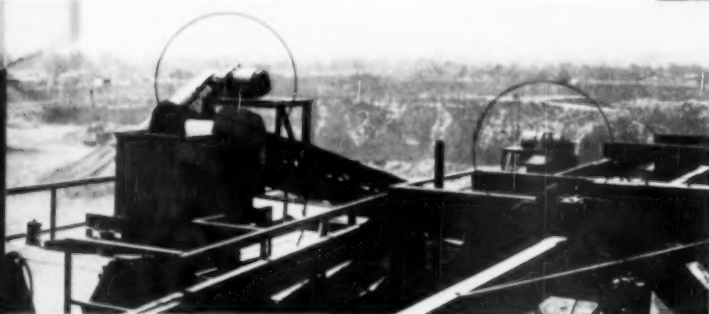
THE MODERN GEAR DRIVE FOR EXPOSED SETTINGS

A drip-proof motor is superior to an open motor for heavy-duty conveyor service. The U.S. Syncrogear Motor can be selected with gear ratios to give you any desired torque. It's completely housed. You can install a Syncrogear out in the open. No cover is needed. It's built for rugged, heavy duty service, in single, double or triple reductions. No external gear box is required. Note in the colored drawing that the major gears only dip into the lubricant rather than being immersed. This prevents churning and lengthens life of the lubricant.



ALL THESE ADVANTAGES

- WEATHER-PROOF AND DRIP PROOF
- COMPLETELY HOUSED—ONE UNIT
- NO HARM FROM DUST OR DIRT
- GEARED TO ANY DESIRED RATIO
- RUGGED PYRAMIDAL BASE
- HARDENED GEARS—45/50 ROCKWELL C
- ASBESTOS-PROTECTED WINDINGS
- NORMALIZED CASTINGS
- LUBRIFLUSH LUBRICATION
- SEALED OIL RESERVOIR
- CENTRIFUGALLY-CAST ROTOR
- DUAL BLAST VENTILATION



Two U. S. Syncrogear Motors operating conveyor belts approximately 125 feet above ground.

Ask for new descriptive U. S. Syncrogear Bulletin

U. S. ELECTRICAL MOTORS Inc.

PACIFIC PLANT: Los Angeles 54, Calif. • ATLANTIC PLANT: Milford, Conn.

Atlanta 3, Ga.; Bakersfield, Calif.; Boston 16, Mass.; Chicago 8, Ill.; Cincinnati 16, Ohio; Cleveland 14, Ohio; Dallas 9, Texas; Detroit 2, Mich.; Fresno 1, Calif.; Houston 4, Texas; Indianapolis 4, Ind.; Milwaukee 2, Wis.; Minneapolis 2, Minn.; New York City 6, N. Y.; Philadelphia 2, Pa.; Pittsburgh 2, Pa.; San Francisco 7, Calif.; Seattle 4, Wash. • Distributors and Agents in all principal cities.



NEW Long Life Pump for Fine Mesh Materials

FOR MANY APPLICATIONS this new Allis-Chalmers Rubber Lined Centrifugal Pump offers great economies over both standard and special types of metal pumps. It is especially effective for handling difficult fine mesh materials ($\frac{1}{8}$ " to 325 mesh) such as sand slurries, slimes and muds, tailings, concentrates and similar substances.

GREATER ABRASION RESISTANCE

The rubber lining offers as much as fifteen times the resistance to abrasion that the hardest special metals offer. The lining is formed around a steel skeleton which allows close control of the properties of the rubber. The lining is then secured in the casing. This unique method provides a mechanically strong and rigid lining which is not subject to "sand blistering."

ADAPTABLE TO YOUR NEEDS

Many different rubber compounds are available to provide longest life in your particular application. A wide range of sizes covers almost every need and, in addition, the capacity is variable by simply changing the speed of the impeller through the *Texrope* V-belt drive. *Vari-Pitch* Automatic Sheave drive provides instant speed changes.

Find out how this new Allis-Chalmers Rubber-Lined pump can save money for you. Ask your nearest A-C Sales Office or send in the coupon today.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.



Send For Free Bulletin

ALLIS-CHALMERS, 975A SE. 70. ST.
MILWAUKEE, WIS.

Please send me Bulletin 08B7311 describing the new Allis-Chalmers Rubber Lined Centrifugal Pump.

Name.....

Position.....

Company.....

Address.....

City..... State.....

A-2992

ALLIS-CHALMERS



**4 YEARS OF STONE-LOADING
SUCCESS...**



**...SO HALQUIST BUYS ANOTHER
TRAXCAVATOR!**

One of the best-known producers of Lannon stone is Halquist Lannon Stone Co., Sussex, Wisconsin. And a top reason for Halquist's high postwar production is TRAXCAVATOR loading.

Even with a considerate operator at the controls, stone-loading equipment gets slam-bang punishment that soon reveals any weakness or unfitness. Shocks — stresses — bumps — abrasion — gang-up on track and lift assemblies, on cables and bucket, trying to murder performance.

That's why it means plenty for a concern like Halquist Lannon Stone Co. to load stone 4 years with a T4 TRAXCAVATOR. And then to turn around and buy another just like it.

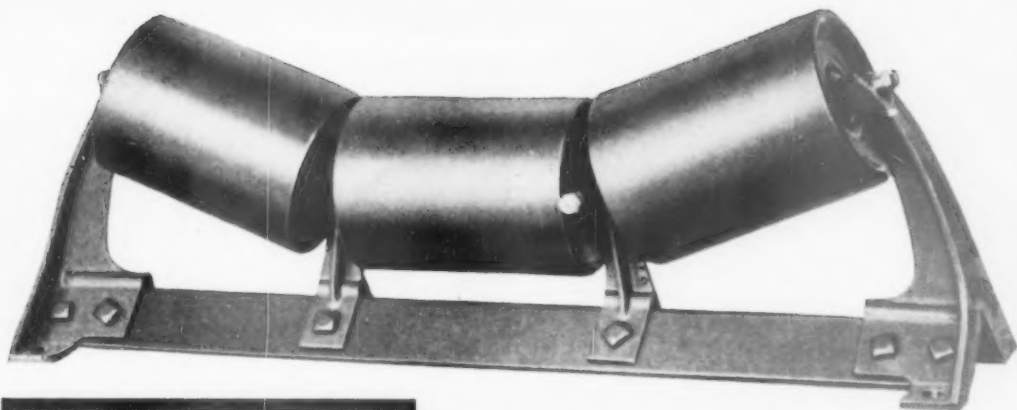
"The TRAXCAVATOR works well in stone; stands up," states A. C. Halquist, for the stone company.

Underground, in open quarry, or at the stockpile, TRAXCAVATORS load rock with speed and with uncommon economy. Full traction-harnessed tractor drawbar power gives the TRAXCAVATOR crowding effort to cram its bucket full of solid, heavy material. Every size of TRAXCAVATOR can dump directly into truck or trailer, or transport short distances with efficiency. The same versatile machine handles stripping work, fast and effectively, too.

Five Models ($\frac{1}{2}$ to 4 cubic yards capacity) make TRAXCAVATOR the only line with a full range of job fitting sizes. See your TRACKSON—"Caterpillar" Dealer for full information on the size you need. Or write direct to TRACKSON-COMPANY, Dept. RP-60, Milwaukee 1, Wisc.

TRAXCAVATOR®

*The Original
Tractor Excavator*



GIVE IT A RIDE—ON JEFFREY BELT IDLERS

Costs must be cut. No question about that . . . and no question about the economy of Jeffrey Belt Conveyors when small or large quantities of material must be handled. We can furnish them by the rod, or mile, just as the job requires. We know how to provide for reliability under tough conditions, handling of peak loads, low investment, high salvage and other things which are problems peculiar to engineering.

Hence, we say, "Give That Material A Ride on Jeffrey Idlers." They are the backbone of the belt conveyor . . . have been the choice of smart operators on thousands of jobs. They are built to take day-after-day punishment . . . have that reserve strength and durability that count for many years of satisfactory, efficient trouble-free service.

Whether yardage looms large in the estimate, or small capacity is desired, Jeffrey engineers are skilled in the application of material handling to most any job. We would like to talk things over—constructively.

Catalog No. 785 Tells All



Self-aligning, Troughing-type Belt Idler

Pivotedly mounted on a supporting cross member, guide rollers are mounted on arms and extend at right angles to idler. Need only to be spaced about 20 to 50 feet apart to keep belt in perfect alignment. Will not damage belt.



Pivoted-type Return Idler

Used for both troughing and flat belt conveyors. Of the self-aligning, two-pulley type. Also standard return rolls pivotedly mounted in ball bearings on supporting cross member. Write for full details about Jeffrey Idlers for either troughing or flat belt service.

THE JEFFREY

MANUFACTURING COMPANY Established 1877

939 North Fourth St., Columbus 16, Ohio

Baltimore 2
Birmingham 2
Boston 16
Buffalo 2

Chicago 1
Cincinnati 2
Cleveland 13
Denver 2

Detroit 13
Hartford
Houston 5
Huntington 19

Jacksonville 2
Milwaukee 2
New York 7
Philadelphia 3

Pittsburgh 22
St. Louis 1
Salt Lake City 1
Scranton 3

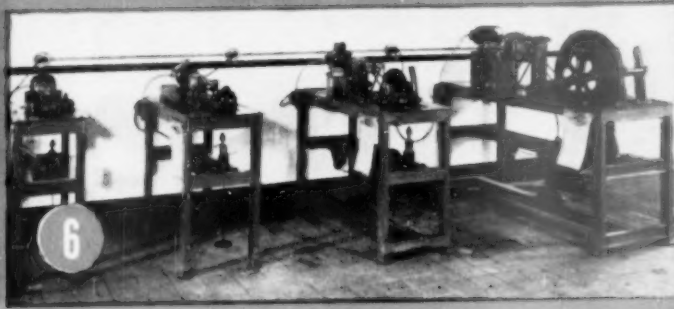
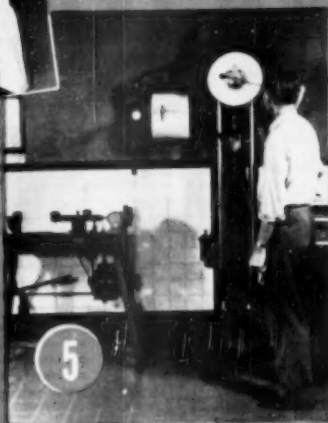
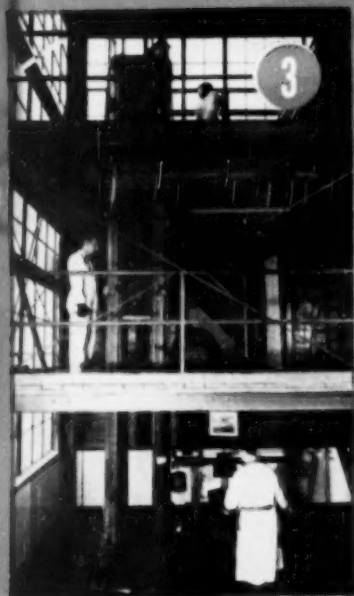
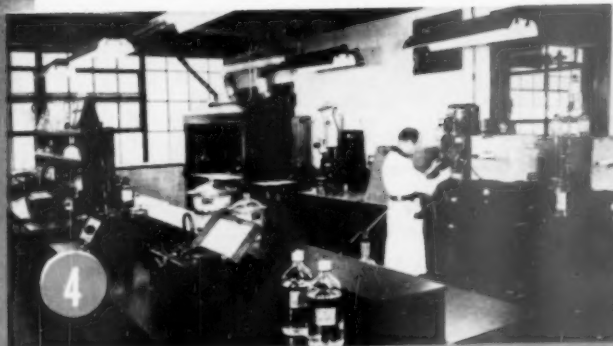
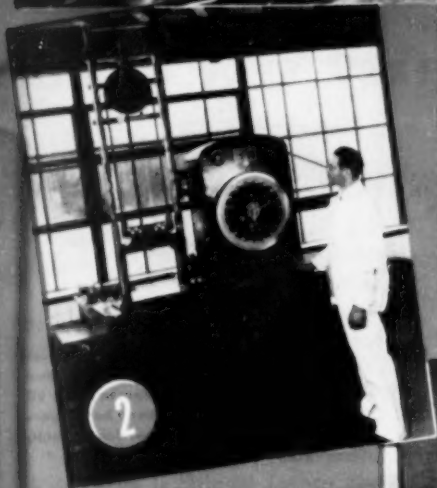
Jeffrey Mfg. Co., Ltd., Head Office & Works: Montreal

Complete Line of
Material Handling,
Processing and
Mining Equipment





how



..... Wire Rope Problems are Studied in the Field... and Whipped in Union Wire's Outstanding Research Laboratory by Technical Experts.....

Not content to sit back and make wire rope as it has always been made—just because it has always been made that way—

Union Wire Rope engineers continuously study problems in the field—bring them into the outstanding Union Wire Rope laboratory—and keep them under constant research until whipped and tested in the field.

The result is a growing line of new wire rope constructions, designed for specific uses, covered by the simplest kind of specifications and identified by the trademarked name TUFFY. Here are some of the steps taken to pre-determine Tuffy toughness that assures longer life.

1. Microstructure Tester. Under powerful magnification, Union Wire metallurgists examine the microstructure of the steel in rods and wires to see that rigid specifications are met and maintained in processing.

2. Static Flexibility Tester. The demand of machinery engineers toward smaller sheaves and higher speed made it necessary for Union Wire Rope Engineers to adapt this standard machine in order to test static flexibility.

3. Rope Testing Machine. This 3-story high machine is designed to test and record the breaking strength of the rope when finished and ready for the customer.

4. Chemical Analysis Laboratory. Steel for Union Wire Rope is made to rigid specifications. Here rods and wires are chemically analyzed to make certain that the correct combinations of carbon, manganese, etc., are kept under control.

5. Wire Tensile & Torsion Tester. In tension and under torsion, this machine tests wires to see that they measure up to the extraordinary high level of strength and toughness mandatory in Union Wire Rope.

6. Wire Fatigue Testers. The fatigue strength of wire rope is the sum total of the fatigue strength of the wires in its construction. Here, the wires in tension and bending are tested for fatigue strength.

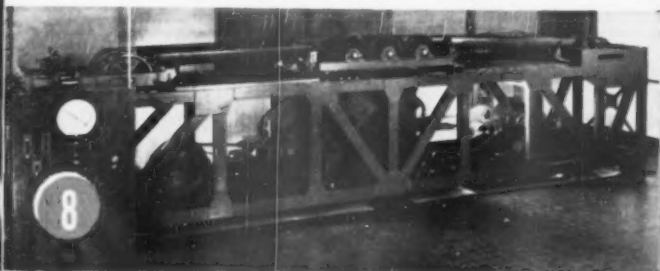
Wire Rope Accelerated Fatigue Tester—Only One of Its Type in Captivity

7. Top view—shows simultaneous testing of three different wire rope constructions. Here, in days, ropes are subjected to punishment equal to weeks or months of hard service.

8. Side view. Designed by Union

Wire Rope Engineers, this accelerated fatigue tester is equipped with sheaves from 8" to 24" permitting application of any bending strain. Tensile loads up to 12,000 lbs. are applied. Thus wire rope life under toughest fatigue conditions is pre-determined.

After Union Wire Rope designs pass all of the exhaustive testing imposed by this array of highly specialized laboratory equipment and technical experts, Union Wire Rope engineers submit it to the final test. In the field, under actual working conditions, they confirm the longer life expectancy indicated by laboratory findings and determine proper application which in itself is vitally important.



Tuffy FAMILY SMASH HIT in Construction Industry

Fathered by necessity, conceived in research—the distinguished Tuffy family of wire rope and braided wire fabric constructions have won the popular acclaim of users throughout the construction industry on the dollars and cents basis of better performance. By running your own comparative tests you, too, will be convinced that Tuffy gives you the ultimate low cost wire rope.



Put Tuffy Draglines to any test. Watch them come out on top with unequaled money-saving records. No more complicated specifications. Just the length, size and name Tuffy. That's all.



Test Tuffy's ability to handle extra yardage. You will change to Tuffy reels on your whole fleet. The name Tuffy, the diameter and the length—that's how simple it is to buy scraper rope for new yardage records.



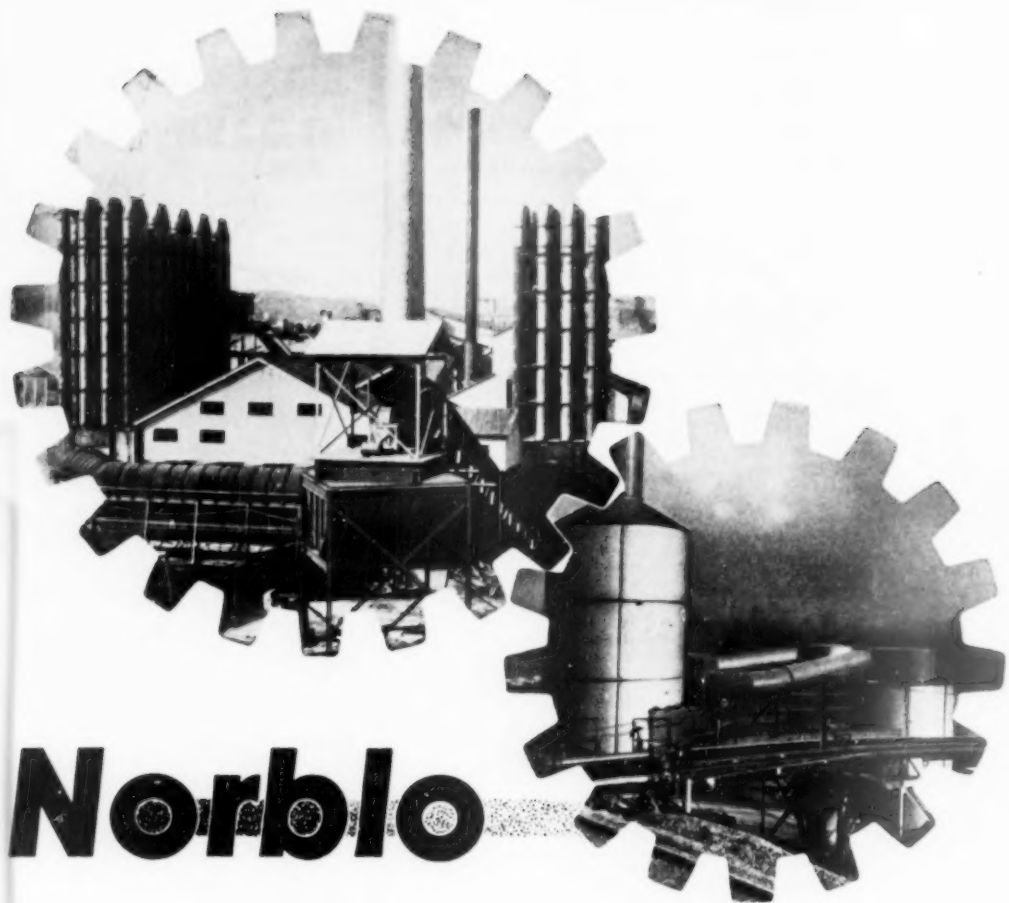
An entirely different, patented, interlaced wire fabric construction gives Tuffy extraordinary flexibility and stamina. Proof tested to twice working load. Ten types—factory fitted.

Write for
Illustrated Folders
on Tuffy
Draglines... Slings
Scraper Rope

union Wire Rope corporation

2156 Manchester Ave.

Kansas City 3, Mo.



Norblo

Heavy Duty

DUST AND FUME COLLECTION

With three types of dust collectors — automatic bag, centrifugal and hydraulic — Norblo installations are geared to the heavy duty requirements of the smelting, mining, cement and rock products, foundry, chemical and milling industries.

Norblo Automatic Bag Type dust and fume collectors are outstanding in per-



formance in continuous operation. These units are adjustable for varying dust load without shutting down. The periodic short cycle cleaning, automatically controlled, insures sustained collection efficiency at maximum. May we send you a handy Norblo Airflow Calculator — no obligation.

The Northern Blower Company

6408 BARBERTON AVENUE

CLEVELAND 2, OHIO

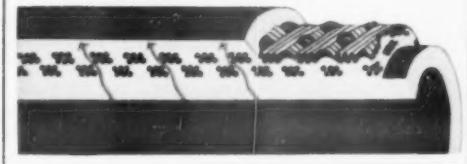
Automatic and Standard Bag Type Fume and Dust Collectors • Norblo Centrifugal and Hydraulic Collectors • Cement Air Cooling Systems • Exhaust Fans

Miners asked for this TOUGH HOSE TEAM!

...to take all of the abuse of Hard Rock Mining

No hose construction has ever been developed to equal Condor Homoflex HEAVY DUTY AIR HOSE and WATER HOSE for flexibility and ability to cushion shock. It's not just a matter of an extra thick cover to withstand the gouges of falling rock and dragging over jagged footings in mines and quarries. The Homoflex "toughness" is more than cover-deep; it is toughness through and through.

HOMOGENEOUS FLEXASTICS "THROUGH-AND-THROUGH"



The enlarged cross section illustration of the Homoflex Hose wall shows how the cover, strength member, and tube are "fused" into one homogeneous unit. You can't separate any part of this hose from another. It is this construction, with all the sinewy resilience of its strength member embedded in Flexlastics that makes possible lighter weight, extreme flexibility and resistance to kinking, with no sacrifice of safe working pressure.

Ore miners and quarrymen have long called for better hose to take the abuse of falling rock, sharp bends and rough handling. Miners can't "baby" hose. If it doesn't stand up, it is sometimes a risk to safety and always costly to replace. To answer the toughest of all hose problems, Raybestos-Manhattan engineers developed the TWIN TEAM of Condor Homoflex HEAVY DUTY AIR HOSE and Condor Homoflex HEAVY DUTY WATER HOSE.



Here's a Condor Homoflex Air and Water Hose Team suspended from a telescopic mast where a Jumbo drill is taking down roof. Air hose is working at 100 pounds pressure in this Oklahoma zinc mine.

Now, wherever wet drilling is done, this team of Homoflex Air and Water Hose is in demand. If you are not yet using Condor Homoflex Hose on your wet drills, get some from your nearest Manhattan Distributor. It's a good way to end hose kinking or collapsing and assure peak drill production with a constant, full feed of air and water through the hose.

(Condor Homoflex Heavy Duty Air Hose has an oil-proof tube, and is ideal for all other heavy-duty mining, quarrying and construction work).

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY



RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

NO

time-out

for CLUTCH ADJUSTMENTS



KOEHRING DUMPERS* have the same heavy-duty qualities and big-production ability as Koehring excavators . . . combined, they give you matched excavating-hauling efficiency. Rugged 6-yard rock body . . . plus a ton of Dumper strength for every ton of payload, withstand



severest shocks of shovel loading and roughest off-road hauling. Constant-mesh transmission and 3 fast speeds, forward and reverse, provide no-turn shuttle hauling. 1-second gravity dump saves more time every trip.

*Trademark Reg. U. S. Pat. Off.

KOEHRING COMPANY

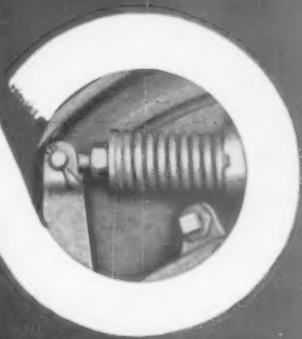
Milwaukee 10, Wisconsin

Subsidiaries: JOHNSON • PARSONS • KWIK-MIX

with KOEHRING HALF-YARD 205



HEAT COMPENSATOR SPRING
CHANGES TENSION ...
Automatically!



● With Koehring ½-yard 205, there's no time-out for continuous manual clutch adjustments. It's no longer necessary for operator to tighten cold clutches when he starts in the morning, or between shifts . . . then loosen them again when clutches warm up. Large compensator springs on the 205's main drum (above), swing and traction clutches automatically make all tension changes . . . maintain full clutch efficiency. No "compromise" settings . . . you get top production all through the shift . . . have accurate, smooth control at all times. Gives you bigger daily yardage as shovel, dragline or pull shovel . . . is

equally important on clamshell and heavy lift crane service, where you have intermittent usage.

Also, with Koehring 205 you get double-fulcrum control linkage on crowd-retract and traction that eliminates overtravel, drag and chatter . . . independent traction, to travel, swing and operate boom all at same time. Choice of crawler or truck mounting, whichever best fits your operating requirements. Your local Koehring distributor can show you many other 205 features that will save time and assure more production at lower cost on your work. See him today.

K900

OTHER KOEHRING EXCAVATOR SIZES: ¼ yd. 304 • 1½ yd. 605 • 2½ yd. 1005



The motor in the background transmits 600 horsepower through a hollow shaft to one impeller of this crusher while the motor in the foreground transmits 400 horsepower to the other impeller turning it in the opposite direction. The Gates Vulco Ropes absorb the terrific shocks encountered when hard copper ores are crushed between these impellers—are not bothered by the dust condition present.

Here is exactly **WHY** the Concave Side Saves You Money in V-Belt Costs

When any V-belt bends in going around its pulley, it is forced to change its shape.

Naturally so, because the top of the belt is under tension and grows narrower while the body, under compression, *bulges out!*

This change of shape in a *straight-sided* V-Belt, is shown in figures 1 and 1-A—and you will note how the bulging sides press *unevenly* against the V-pulley.

Now look at figures 2 and 2-A. There you see how this change of shape, due to bending, affects the belt that is built with the Concave Side—the Gates Vulco Rope. The precisely engineered Concave Side exactly corrects the side-bulge—and the bent belt *has a shape that exactly fits its sheave groove!*

Two distinct savings result. *First*—There is no side-bulge to cause uneven wear. The sides press *evenly* against the V pulley and therefore wear *uniformly*—resulting in *longer life!* *Second*—The full width of the sidewall grips the pulley—thus carrying heavier loads without slippage—and this *saves belts* and also *saves power!*

When you buy V-Belts, be sure you get the V-Belt with the Concave Sides...the Gates Vulco Rope!

What Happens When a V-Belt Bends

Straight-Sided V-Belt



How Straight Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear at Point Shown By Arrows.

Gates Vulco Rope with Concave Side



No Side Bulge. Precise Fit in Sheave Groove. Sides Press Evenly Against V-Pulley—Uniform Wear—Longer Life!

CS-505

THE GATES RUBBER COMPANY
DENVER, U.S.A.

The World's Largest Makers of V-Belts

GATES VULCO ROPE DRIVES
IN ALL INDUSTRIAL CENTERS at the U. S. and 71 Foreign Countries

Engineering Offices and Jobber Stocks



more hauls,
lower maintenance costs

with **Gulflube Motor Oil H.D.**

says this Superintendent

"Our trucks work on an exceptionally heavy schedule", says the Superintendent of this trap rock quarry. "As a result, we don't get a chance to service them as often as we'd like. But there are two maintenance practices that we follow religiously. We use a high quality detergent motor oil — Gulflube Motor Oil H.D. — and change it regularly. This practice has paid us dividends. After two years of operation, our engines are remarkably clean. We've had no stuck or fouled rings, and no delays attributable to lubrication."

A typical statement from one of the hundreds of operators of heavy-duty trucks who use Gulflube Motor Oil H.D. Year after year they find that it keeps engines clean, keeps wear to a minimum—keeps maintenance costs down.

Ask a Gulf Lubrication Engineer to tell you more about Gulf's new detergent motor oil, Gulflube Motor Oil H.D. Write, wire or phone your nearest Gulf office today.

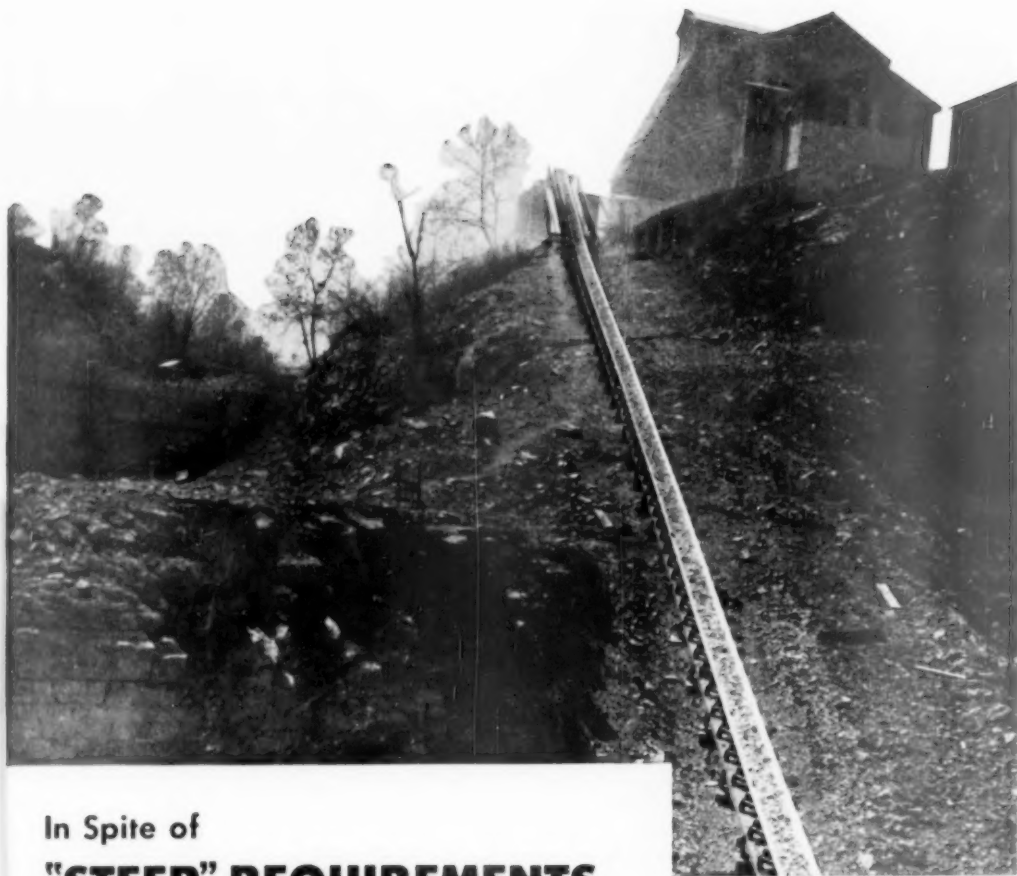
Gulf Oil Corporation • Gulf Refining Company

GULF BUILDING, PITTSBURGH, PA.

Sales Offices • Warehouses

Located in principal cities and towns throughout
Gulfs marketing territory





In Spite of "STEEP" REQUIREMENTS

S-A Engineers Elevate 300 Tons an Hour from Quarry Floor

Crushed stone, elevated on a 500-foot long S-A Belt Conveyor, quickly climbs a slope—too rugged and steep for trucks—from quarry floor to crusher and screening plant a hundred feet above. As designed by Stephens-Adamson engineers, this efficient installation handles stone at lowest cost per ton.

However "steep" any bulk material handling requirement may be, S-A can provide a practical answer—based on nearly fifty years' experience in designing bulk conveying systems. S-A engineers are unbiased in their recommendations, because they can offer the right conveyor units from a complete line of equipment for any specific job.

If you have bulk materials to move, ask S-A for suggestions. Write today . . . there's no obligation.



CASPER STOLLE QUARRY CO.
Falling Springs, Ill.

S-A belt conveyor works at a maximum rate of 300 tons per hour—with an average 5-hour capacity of 2000 tons. Conveyor picks up stone from primary crusher and conveys it to surge bin near the plant at top of quarry. Withdrawn by an S-A pan feeder, stone is delivered as needed to the plant employing a bucket elevator previously installed. Continuous or intermittent flow of stone from quarry to surge bin permits continuous plant operation, independent of pit activity.

STEPHENS-S-ADAMSON

7 Ridgeway Avenue, Aurora, Illinois MFG. CO. Los Angeles, Calif. • Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

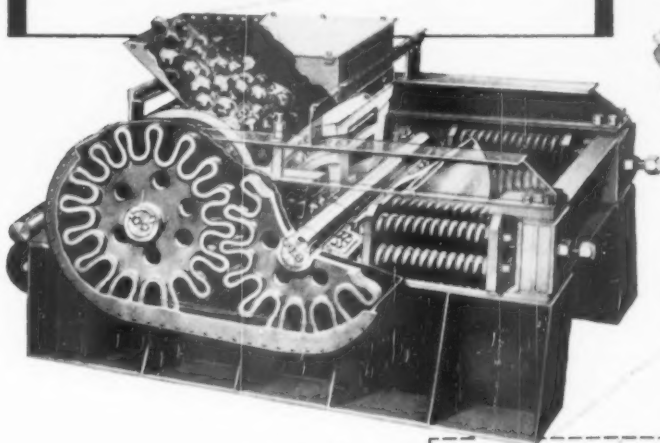
One ax handle wide... 65 miles a day...

THAT'S THE WIDTH... and the speed... of a 54" x 24" roll crusher. It can turn out a ribbon of pay material 24" wide... 65 miles long every day.

Each rock is *grabbed* by the rolls and is force fed in a continuous crushing action. No eccentric... no intermittent crushing... no gravity feed... and the material is cracked, not pulverized.

Of course Pioneer makes roll crushers. We're roll crusher specialists! We build twin rolls in four sizes... we build them for stationary plants and we build them on wheels... we are the only manufacturers of Triple Roll Crushers. As specialists, we originated "Star Gear" drive for roll crushers, we have cheek plates that make shells wear uniformly from end to end. And we know how to keep shells from banging together... and cracking.

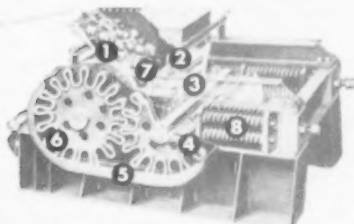
If you want more specification material at lower cost per ton, mail the coupon today.



TRIPLE ROLL CRUSHERS for increased stage of reduction, made in three sizes: 54" x 24", 40" x 22" and 30" x 18". Third roll attachment available for Pioneer Twin Roll Crushers.



COMPLETE SECONDARY UNITS for stationary plants. Pioneer builds Roll Crushers on skids, with motor or power unit and drives. Simplifies installation... assures satisfactory operation from the start.



1. Hopper Spreads material over full width of roll.
2. Cast Manganese Steel Shells held in place by full circle wedges.
3. Shells Changed without removing bearing from shaft.
4. Timken Roller Bearings in self-aligning pillow blocks.
5. Oil Tight, dust tight gear housings.
6. Star Gear Drive eliminates chains.
7. Wedge Blocks provide easy adjustment.
8. Safety Spring Release protects crusher.

BUY BOTH!

Higher Output,
Lower Upkeep!

Pioneer

Continuflow EQUIPMENT

MAIL COUPON TODAY!

Pioneer Engineering Works

1515 Central Avenue • Minneapolis 13, Minn.

● Please send information on the Roll Crushers checked:

☐ 24 X 16 ROLL CRUSHER
☐ 30 X 18 ROLL CRUSHER
☐ 40 X 22 ROLL CRUSHER

☐ 54 X 24 ROLL CRUSHER
☐ TRIPLE ROLL CRUSHER
☐ ROLL CRUSHERS ON WHEELS

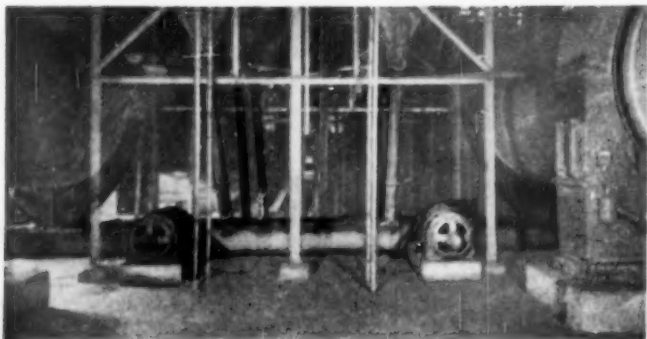
Name

Company

Address

City Zone State

3 hp instead of sixty

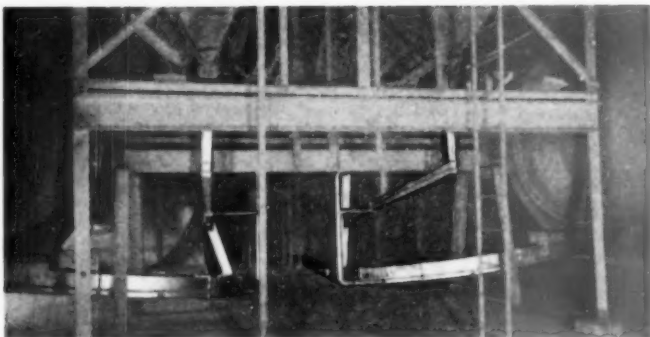


The conventional conveying system above required four motors—two not shown—to drive 2 sets of 2 screw conveyors which carried cement from two finishing mills. Hoppers (both views) discharge precipitated cement dust to the system.

F-H Airslide Conveyors have taken over! Note simplicity of equipment and how much less is required to do the same job!

...with

F-H AIRSLIDE



Less equipment, maintenance and supervision!—No moving parts to get out of order! Elimination of costly down-time!...That's what happens when an F-H Airslide Conveyor takes over!

Simplicity itself, Airslide aerates dry, pulverized material such as hydrated lime, pulverized limestone, phosphate rock, finished cement and similar products so *that they flow like water!* And, the only power required to move this material is low-pressure air in small quantities—and gravity.

If conveying costs are eating into your profits—now is the time to call in a Fuller representative. We will study your problem and recommend the type or types best suited to your requirements. No obligation of course.

fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS
COMPRESSORS AND VACUUM PUMPS
FEEDERS, AND ASSOCIATED EQUIPMENT

FULLER COMPANY, Catawago, Pa.
190 S. LaSalle St., Chicago 3
490 Chancery Bldg., San Francisco 4

You'll move more **ROCK** for your money,
over the years, with a

MARION 4161



Sixty-five years have taught us what it takes to build **REAL** shovels . . . how to build qualities into them that don't meet the eye but are eloquent in terms of performance and dependability.

These extra qualities are **MORE** than worth every penny they cost.

THE MARION 4161

has made an impressive name over the years . . . one company owns 26 of these machines . . . and another has 25!

MARION is proud of the 4161 and its record . . . and stands behind this and every other machine that bears the MARION name.

We build good shovels and we back up every MARION owner only for one reason . . . it's the best way to give you more for your money . . . both for today and over the years.

MARION

POWER SHOVEL CO.
MARION, OHIO, U. S. A.

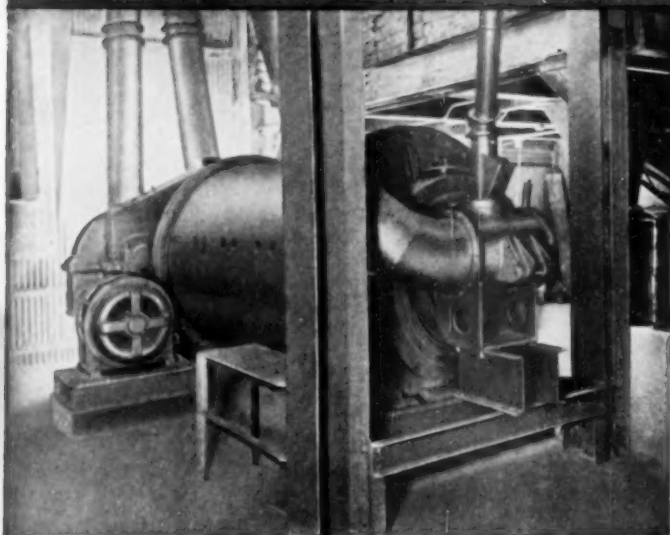
OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES



from 3 1/2 cu. yd.
to 45 cu. yds.

KVS

AGRICULTURAL LIMESTONE AND LIME MANUFACTURE

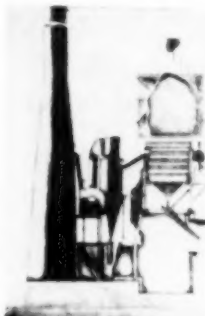


THIS 5½' x 8' KENNEDY AIR SWEEP TUBE MILL PRODUCES 7 TONS PER HOUR—With a feed of ¼ x ¾ in. limestone and dust

Use the Kennedy Air Swept Tube Mills to get superfine grinding at bottom costs. The product ground in this tube mill and collected in three cyclones is (1) 5 tons per hr. of 80% thru 200 mesh, (2) 1 ton per hr. of 92% thru 200 mesh, and (3) 400 lbs. per hr. of 99.8% thru 325 mesh. Simple adjustment permits a desired variation from this combination of fine mesh sizes. The mill is driven through the remarkable Kennedy Integral Gear Drive for Tube Mills. This enables the motor to be direct-connected to the high speed shaft. The gears cannot be misaligned or set wrong. Power required to drive the mill is thus greatly reduced.

It is now possible to combine the superior product of a rotary kiln with the operating economy of a vertical kiln with the Kennedy Stone Preheater and Deheater. By partial calcining the material this system reduces kiln wear and kiln lengths. It recovers and utilizes exit gases, and has proved to efficient in actual operation that 40% fuel savings and increased output exceeding 20% have been obtained.

Short kilns employing the Kennedy method also acquire an internal glaze which lessens the wear on kiln liners, lowers the power requirements, and reduces formation of kiln rings. Over burned and underburned lime is practically eliminated. Coal feed and lime calcination are switch-board controlled.



The latest in scientific lime production KENNEDY STONE PREHEATER - ROTARY KILN DEHEATER and SOAKING PIT



20% Increase in Capacity—40% Savings in Fuel

KENNEDY ROLLER BEARING GEARLESS CRUSHER . . .

With a Synchronous Motor built in its pulley, this machine shows 80% saving in the cost of maintenance and a saving of 50% in power over geared crushers. It has produced 156 tons per hour when set to 7/16" between the head and concaves at the bottom. The motor runs on roller bearings and is continuously lubricated by a force feed lubrication system. The motor is built especially for this crusher.

Kennedy-Van Saun Manufacturing and Engineering Corp.

2 Park Avenue, New York 16, N. Y.

WICKWIRE ROPE

A PRODUCT OF

CF&I

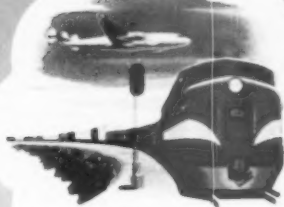
Ask any user...you'll find them everywhere

In scores of industries, users of Wickwire Rope have developed an affectionate respect for its performance, safety and long life. And, for true economy, they use Wickwire's **WISSCOLAY®** Preformed. It lasts longer — is easier to cut, splice and install. It's kink-resistant and safer to handle. Wickwire Distributors and Rope Engineers, in key cities everywhere, are prepared to render prompt service in meeting your wire rope needs. Wickwire Rope Sales Office and Plant — Palmer, Mass.

IN THE EAST—Wickwire Spencer Steel Div. of C. F. & I.
500 Park Ave., New York 18, N. Y.

IN THE ROCKIES—The Colorado Fuel and Iron Corp.
Continental Oil Bldg., Denver, Colo.

ON THE WEST COAST—The California Wire Cloth Corp.
1080—19th Ave., Oakland 4, Cal.



TRANSPORTATION



LOGGING



MINING



PETROLEUM



MANUFACTURING



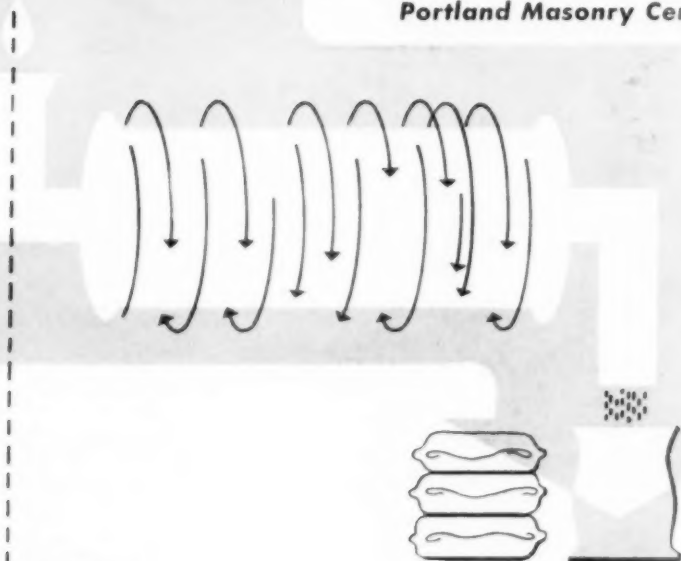
CONSTRUCTION



MARINE

airalon

**a new, ready-to-use air entraining agent . . .
and plasticizer for
Portland Masonry Cement**



airalon

is a highly effective mixture of resin acids and fatty acids. It contains, in one easy-to-handle compound, the necessary ingredients to make a high quality masonry cement.

airalon makes masonry cement "fatter", more buttery. At normal air contents, Airlon improves water-retention and workability-retention. At lower than normal air contents, Airlon maintains present quality standards, with increased strengths when hardened.

airalon is economical to use. It enables the cement maker to produce his present quality masonry cement at lower cost . . . or to produce a higher quality masonry cement at no increase in cost. Because Airlon is added at the cement mill as received, in liquid form, it simplifies problems of inventory, handling, and storage. And because Airlon is a good grinding aid, it eliminates the expense of one.

airalon has been exhaustively tested in our own laboratories and in large commercial grinds . . . has the approval of ASTM under Cement Specification No. C175.

Dewey and Almy Chemical Company

CAMBRIDGE 40, MASS.
CHICAGO 38
MONTREAL 32

AIRALON T.M. OF D & A C C

**CUT your
hourly cost . . . UP your
hourly
production**



with
**Firestone
TIRES**

ROLLING equipment represents a profitable investment, but idle equipment means dead loss. When a unit stops, production stops—but costs go right on. We say—and we'll welcome a chance to prove it—that we can shorten your downtime and boost your production with Firestone Tires.

- **WE CAN DO IT** because we carry a complete line to furnish you the right tire for your type of work.
- **WE CAN DO IT** because there's extra material, extra quality, extra skill put into every tire we make.
- **WE CAN DO IT** because our service organization is prepared to see that you get out of Firestone Tires everything we build into them.

Can we do it? . . . Just let us show you! See your Firestone Dealer or Store for complete information.

*Listen to the Voice of Firestone every Monday evening, over NBC.
Copyright, 1950, The Firestone Tire & Rubber Co.*

**GROUND
GRIP**

EARTH MOVER ROCK GRIP ALL TRACTION

**When you buy new tires or new equipment
always specify **Firestone**
OFF-THE-HIGHWAY TIRES**

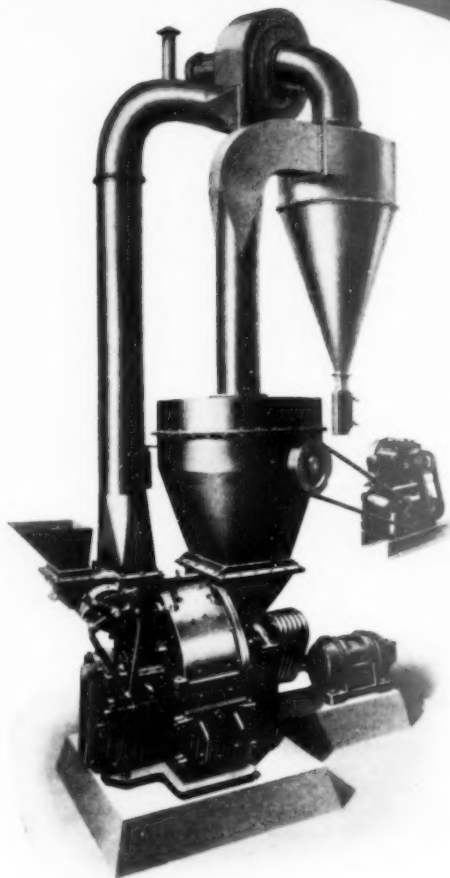
A Low-Cost Answer to Your

RAYMOND Continuous, Automatic, Dustless System of

The Raymond Whizzer equipped Imp. Mill has an unusually wide range of applications in the non-metallic industry because of its ease of control, and maintenance and operating economy.

Flash Drying Accessories make this Unit applicable for handling high moisture clays and similar materials. Drying, pulverizing and separating are combined in a single unit of equipment. A uniform finished material is produced without the use of separate dryers.

Close control is assured over the finished product both in fineness and moisture content. One simple adjustment provides wide range fineness control up to 99% or better passing 325 mesh. Automatic temperature controls maintain the final moisture of the product at any desired percentage.



Write for
further
details
and tell us the
requirements of
your problem.

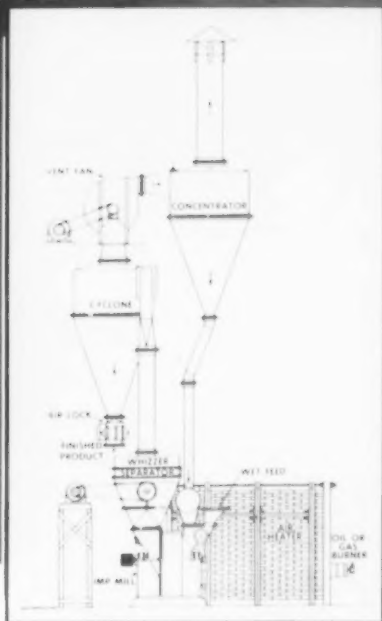
COMBUSTION
RAYMOND PULVERIZER DIVISION

CLAY GRINDING PROBLEMS

RAYMOND builds a complete line of
Roller Mills, Ball Mills, Automatic Pul-
verizers, Screen Mills and Mechanical
Air Separators for the non-ferrous
industries

DRYING • PULVERIZING • SEPARATING

BALL AND
SAGGER CLAYS
MOULDING CLAYS
COATINGS KAOLIN
CERAMIC CLAYS
FILTER CLAYS
CHINA CLAYS
FILLERS



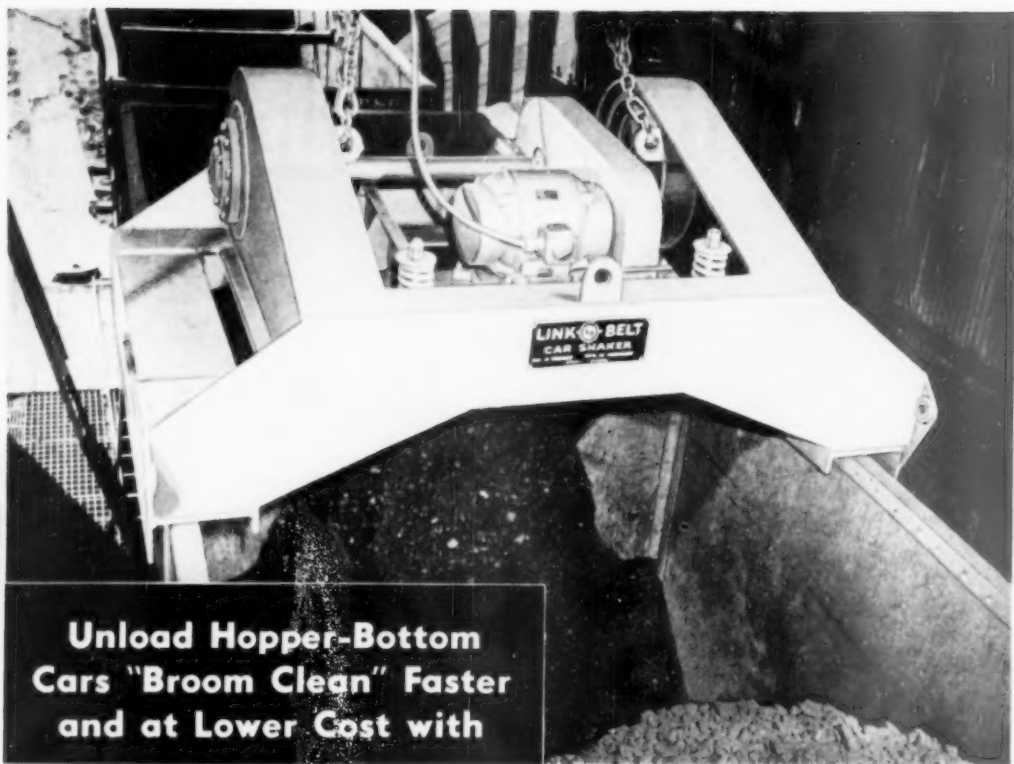
This flow sheet shows a typical arrangement of the Imp Mill with Flash Drying System for simultaneous drying, grinding, and classifying clays and similar materials with initial moisture. As a typical example using one of these units, a Raymond #53 Imp Mill is, in one case, producing 9300 pounds of fire clay per hour at a fineness of 96% passing 100-mesh. The initial clay contains 23% moisture, which is reduced, by means of Flash Drying accessories, to 3% or below in the final product.

ENGINEERING-SUPERHEATER, INC.

1307 North Branch Street

Chicago 22, Illinois





**Unload Hopper-Bottom
Cars "Broom Clean" Faster
and at Lower Cost with**

LINK-BELT CAR SHAKER

THE ONLY CAR SHAKER WITH ALL THESE IMPORTANT FEATURES

POSITIVE ACTION—Lower vibrator speed results in positive impact action. Easier on cars. Vibrator rate adjustable in the field for all types of materials—sand, stone, gypsum, pyrites, ore, cinders, slag, etc.

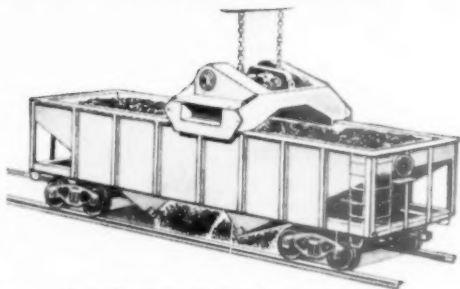
ELIMINATES OBJECTIONABLE NOISE—Low-frequency results in a relatively low sound level.

LOWER COSTS—Only 1 to 3 minutes required for "broom-clean" unloading of most cars. Especially effective for unloading damp or sticky materials.

LONGER LASTING, SAFE—Lower operating speed reduces wear and maintenance. Rugged construction. No picks or hammers needed. Less hazard to crew.

UNDIVIDED RESPONSIBILITY—Link-Belt can furnish, when required, the complete system, including shaker, hoist, frame, track hoppers, feeders and conveyors.

Check your present unloading methods against the dollar-saving efficiency assured by Link-Belt's exclusive features. Get full details on installation and application to your needs. Send for Book No. 2345.



Simple, Fast Operation!

- ★ Lower the Link-Belt Car Shaker to the top of car walls.
- ★ Start motor. Positive-action vibration on car sides and hopper bottoms does the job clean and fast.

LINK-BELT COMPANY

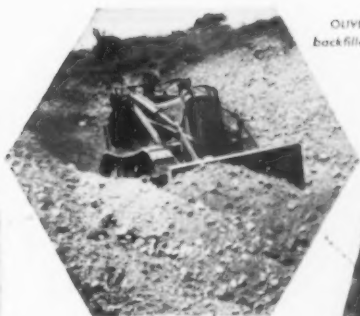
Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24,
Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices in Principal Cities.



OLIVER HG Crawler Tractor
with Ware Loader loading
sand into truck.



OLIVER HG Crawler Tractor with Ware
backfiller blade attached to shovel arms.



OLIVER Model "88"
Wheel Tractor with Ware Boom
handling cast iron pipe.

...take the "Load" out of Your Loading Problems!

Whatever your loading problem, the easy, economical answer is an Oliver Crawler Tractor or Oliver Industrial Wheel Tractor and Ware Front-End Loader.

These powerful tractors and the hydraulically operated loaders are easy to operate . . . easy on maintenance and operating costs. Lift and bucket are hydraulically controlled. Hydraulic control of bucket assures greater breaking-out action and full loads . . . prevents wasteful spillage. "Midsection" pivot allows longer reach of dumping position and distributes the weight advantageously over the tractor frame to minimize strain. The hydraulic rams are designed to take most of the shock loads, assuring longer life for both tractor and loader.

And, the tractor-loader unit can be quickly converted to backfiller, boom or lifting fork. Special buckets are available for coal, snow or humus loading. The hydraulic system can be used to power other equipment such as mowers, sweepers, etc., in combination with the loader. For all the facts, see your local Oliver Industrial Distributor, or write direct to:



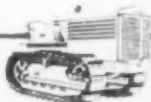
OLIVER Model "88" Wheel Tractor and
Ware Loader loading out gravel.



OLIVER HG Crawler Tractor
with Ware Loader •
on ditching job.

THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio
A complete line of Industrial Wheel and Crawler Tractors



"THE SIGN OF
EXTRA SERVICE"

"...we used to let jobs
go by...now with our
LORAIN on rubber
we really move around"

DIAMOND GRIT CO. operate one plant, covering about 30 acres with 2 separate pits . . . and needed a mobile shovel to move readily back and forth between the two. With their Lorain, they dig sand, gravel, clay, dirt and occasional streaks of tough iron ore. A Lorain on rubber saves time and money for them . . . and does the job better!



DIAMOND GRIT COMPANY BALTIMORE, MARYLAND

tried a new idea when they bought their new Lorain rubber-tire Self-Propelled shovel. Other operators were skeptical about Diamond's departure from traditional crawler mounting . . . but President W. E. Thomas tells below how Lorain rubber-tire mobility has paid off . . .

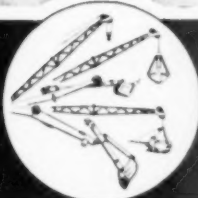
"Like a lot of smaller concerns, we do not have separate pieces of equipment to do each job, and formerly we let lots of jobs go by because we hesitated to move our crawler equipment from place to place. *It was my desire for years to have a piece of equipment we could really move around at will.*

We now have it in our Lorain Self-Propelled shovel and use it to supply the plant, stripping, stocking, loading and to set machinery."

Lorains on rubber can add to your work range, too. They are fast and mobile . . . can move around the pit at high speed . . . can charge bins, load orders, erect plant structures, set machinery . . . and save time on dozens of moves. Your Thew-Lorain Distributor offers the most complete rubber-tire line . . . 2-engine Moto-Cranes (30 m. p.h.) or single-engine Self-Propelled (7 m. p.h.) in 4 or 6 wheel models . . . with 2 or 3 driving axles . . . 5 interchangeable booms. Ask him to pay your plant a visit!

THE THEW SHOVEL CO.
LORAIN, OHIO

THEW LORAIN®
on CRAWLER or RUBBER



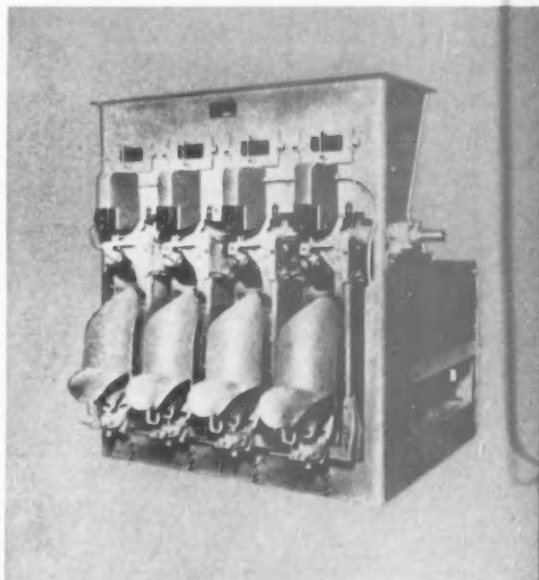
SHOVELS
CRANES
DRAGLINES
CLAMSHELLS
HOES

Easier Handling! Better Packing! Lower Cost!

Uniformly high quality of paper and construction has given St. Regis Multiwall Bags a preferred position in the cement industry. They assure higher production and greater efficiency and dependability right down the line.

St. Regis likewise makes an important contribution to cement manufacturers through its automatic Multiwall Bag Filling Machines. The "delayed discharge" feature of the new St. Regis 150 FC Packer—illustrated here—enables entrapped air to escape from the bag—keeps dust off—means cleaner, brighter bags.

St. Regis can help to increase production and cut costs in your plant! Write or call the St. Regis Sales Office nearest you for detailed information.



SALES SUBSIDIARY OF ST. REGIS PAPER COMPANY

ST. REGIS

SALES CORPORATION

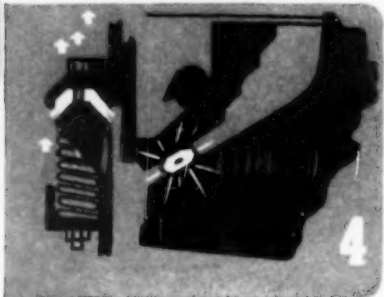
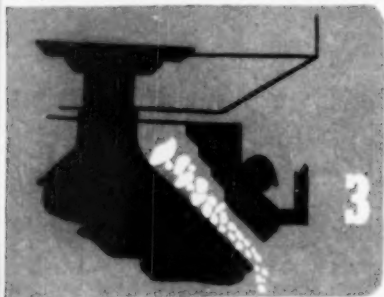
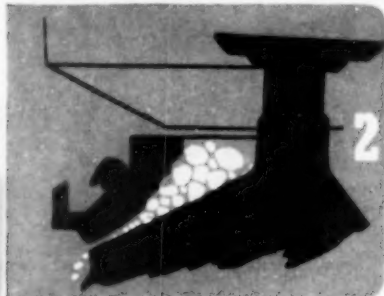
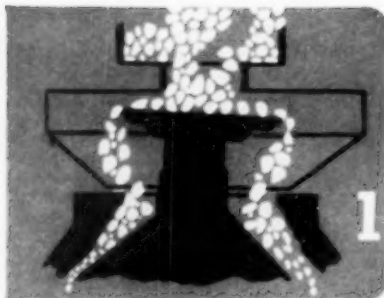
230 PARK AVENUE • NEW YORK 17, N. Y.

YOU BUY PROTECTION WHEN YOU BUY MULTIWALLS

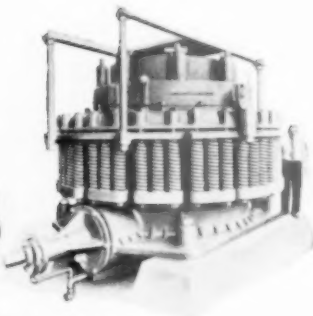
Allentown, Pa. • Atlanta
Baltimore • Birmingham
Boston • Chicago
Cleveland • Denver
Detroit • Houston
Kansas City, Mo. • Los Angeles
Louisville • Minneapolis
New York • Norfolk • Ocala, Fla.
Portland, Ore. • St. Louis
San Francisco • Seattle

In Canada
St. Regis Paper Co. (Can.) Ltd.
Montreal • Hamilton • Vancouver





4 BIG REASONS why



Symons Cone Crushers lead in the fine crushing field

1 uniform controlled feed

Feed platform with adjustable spout in conjunction with the oscillating feed plate combine to control and uniformly distribute the feed to the crushing cavity.

2 maximum liner utilization

With the Symons process of crushing, the crushing action occurs throughout the entire length of the cavity. Uniform manganese wear means minimum scrap loss and low manganese cost per ton of crushed product.

3 large discharge area

Wide throw of head creates a large opening for free and rapid discharge of crushed fines. This allows rapid entry of new feed into the cavity, an essential factor for big capacity.

4 protection from tramp iron

The circle of heavy springs permits the bowl and adjustment ring to rise to allow a non-crushable object to pass through without damaging the crusher. After the tramp iron is discharged the crusher automatically returns to its original setting.

These are but a few of the exclusive Symons Cone features that make possible the enormous output of fine product which has won for this crusher the position of world leadership in the fine crushing field.

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN

NEW YORK • SAN FRANCISCO • WASHINGTON • SPOKANE
MEXICO, D. F. • LONDON • TORONTO • JOHANNESBURG



C 501

NORDBERG

*Machinery for processing
ores and
industrial minerals*





Save on Swing

with
MAGNETORQUE*

LOOK TO P&H FOR ADDED VALUES!

Faster digging cycle... up to 20 percent faster... is yours with the P&H Magnetorque* electric swing. Only Magnetorque can give you faster, smoother starts and stops that make this possible. It means greater production, lower cost, and more profits. You'll say it's the greatest advancement ever made on large draglines and shovels. You can say good-bye to swing friction troubles... once and for all. Power is transmitted electro-magnetically... there's no friction... there's no wear... and far less time-outs to rob production. The smooth operating Magnetorque lasts the life of the machine.

On all kinds of digging the Magnetorque can help you cut yardage costs. Magnetorque electric swing is standard on the P&H 1055 (3½ cu. yds.) and the new 955-A (2½ cu. yds.). Write today, for more information.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch.

P&H EXCAVATORS
4465 West National Ave.
Milwaukee 14, Wis.
HARNISCHFEGER
CORPORATION

EXCAVATORS • OVERHEAD CRANES • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • CRAWLERS AND TRUCK CRANES

Automotive Shovel With Hydraulic Crowd and Hoist Speeds Up Excavation Work

Unit Reduces Excavation Costs; Loads Up To One Cubic Yard A Minute

MOVING SHOVEL LOADERS to and from jobs is one of the most expensive unproductive costs in excavation work. Contractors lose hundreds of hours and spend thousands of dollars annually moving this equipment. Developments since the war show that contractors can be relieved greatly of these costs. One of the most successful developments has been the manufacture of the rubber-tired Dempster-Diggster shovel loader that travels at truck speeds.

Digs Through 15 Foot Bank

Construction men have found that on big jobs the Dempster-Diggster has no equal for working in tight places and for freeing big shovels for heavier work. The Diggster has an 8 foot 10 inch crowding reach, will dig through a 15 foot bank, and will dig 15 inches below grade.

Manufacturer's tests and contractor's reports show that the Diggster will load up to one cubic yard a minute. This speed in excavation is accounted for, mainly, by the Diggster's exclusive independent hydraulic crowd and hoist action, the hydraulic steering, and wheel-type traction.

The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver sensitive, finger-tip control. When accelerated, a one-handed twist of the steering wheel puts the machine in any desired position. By operating on rubber-tired wheels, the



ENCLOSED STEEL CAB protects operator against inclement weather.



THE DEMPSTER-DIGGER is shown here digging out a 15 foot bank of hard chert. The power crowd permits bucket to keep digging until loaded . . . no digging with wheels.

Diggster, of course, can move at the fastest possible speed.

Not A Fair Weather Machine Only

Under adverse conditions on a state highway near Charleston, W. Va., recently, the Diggster loaded 150 cubic yards of sticky blue clay in only three hours. The work consisted of cleaning up slides on 14 foot embankments on both sides of a concrete road. The weather was not cooperative, inasmuch as considerable rain fell the night before. But the Diggster showed no tendency to slide. The job foreman stated that it loaded more material in two hours than the $\frac{3}{4}$ and $\frac{1}{2}$ cubic yard truck shovels normally did in an entire day. This and many other operations in inclement weather have proved that the Diggster is not a fair weather machine only.

The Dempster-Diggster has a 15 foot turning radius, is 20 feet long when bucket is in traveling position, and is nine feet and six inches in height.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and $1\frac{1}{4}$ cubic yard (heaped) capacities. Materials handling buckets in $1\frac{1}{2}$ and 2 cubic yard (struck) capacities.

Crawler Traction Available

For fast, efficient operation in difficult terrain, the Diggster is available with crawler-type traction.

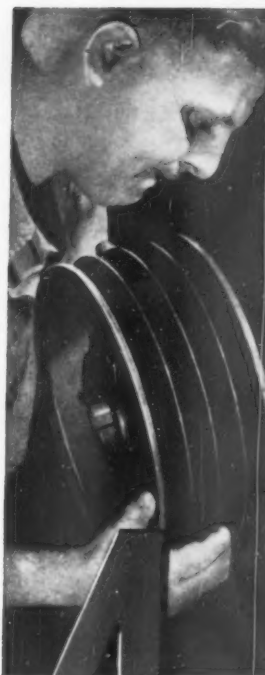


Complete information and prices may be obtained by writing the manufacturer, Dempster Brothers, Inc., Knoxville, Tenn.



DEMPSTER BROTHERS

360 N. KNOX
KNOXVILLE 17, TENNESSEE



TEXROPE
Greatest Name in
V-Belt Drives

4 BIG ADVANTAGES!



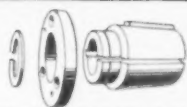
ONE PIECE MOUNTING

Bushing and sheave go on together. One motion mounting. Alignment is easier. Sheave is on right first time.



POSITIVE DRIVE

Bushing is keyed to both shaft and sheave. No slipping. No sheared screws. No jammed bushings from bent screws.



FULL CIRCLE GRIP

Bushing split full length with separate collar. Grips shaft full length around full diameter. No forcing or distortion. Grip easily broken. No hammering.



WIDE SIZE RANGE

Magic Grip sheaves are available from 3" pitch diameter up. Style NC bushing for smaller sizes and Style C bushing for larger sizes.

MAGIC GRIP SHEAVE

YOU CAN MOUNT a *Magic Grip* sheave faster than any other sheave you can buy . . . and demount it just as fast. When you mount a *Magic Grip* sheave it runs true. It will not slip or jam. It always comes off easily.

Even if you don't change sheaves often, you should have *Magic Grip* sheaves on every drive to eliminate the possibility of shaft and bearing damage when ordinary sheaves are hammered or pried on or off.

WIDEST V-BELT LINE

Get everything you need for your V-belt

drives from one reliable source. *Texrope* offers the broadest line of V-belts, standard and variable speed sheaves and speed changers in the industry. And you also get the extra engineering skill that comes from having more industrial V-belt installations than any other manufacturer.

Get your copy of the 144 page *Texrope* Pre-Engineered Drive Manual from your A-C Authorized Dealer or Sales Office or write for Bulletin 20B6956.

A-3022

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.



Texrope and *Magic Grip* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Sold . . .

Applied . . .

Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.



MOTORS — 1/2 to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters, push button stations and components for complete control systems.



PUMPS — Integral motor and coupled types from 1/2 in. to 72 in. discharge and up.

No other dirtmover can offer opportunities for steady earnings. The C Tournear is a simple, rugged, specialized tool for doing certain types of work at a far lower cost than is customary with general purpose machines you buy.

Note that each of these auxiliary interchangeable units is a simple, rugged, specialized tool for doing certain types of work at a far lower cost than is customary with general purpose machines you buy.

No other dirtmover can offer you the opportunities for steady earnings that come to you with C. Tourna-pull. Behind this high-speed, rubber-pull. Behind this high-speed, rubber-tired prime mover you can interchange at will six different types of equipment to keep working and earning all year-round. Each fits specific needs for earning extra profits on stripping, hauling, lifting and materials-handling around your property.

Note that each of these auxiliary interchangeable units is a simple, rugged, specialized tool for doing certain types of work at a far lower cost than is customary with general purpose equipment. When you buy any one combination with the C Tournapull prime mover you get with it an extra value in insurance of steady and profitable earnings, because of its great versatility of application with other hauled units.

Tennapell, Tennacore, Tennaphor, Trademark Reg. U.S. Pat. Off. Tennascher, Tennahopper Trademark ©1976 M.

Please send information on C Teurnapull prime mover for work with:

- ☐ Scraper ☐ Rear-dump hauler ☐ Bottom-dump hauler ☐ Flat bed ☐ Crane ☐ Concrete Mixer

NAME TITLE

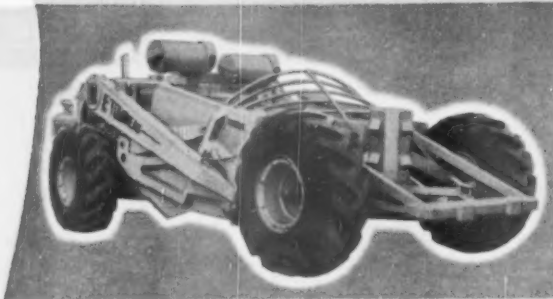
COMPANY..... TYPE OF OPERATION

STREET CITY, STATE

If you have work to subcontract for any of tools shown, please describe fully in letter and we will have your local LeTourneau Distributor put you in touch with nearest owner equipped to handle your work.



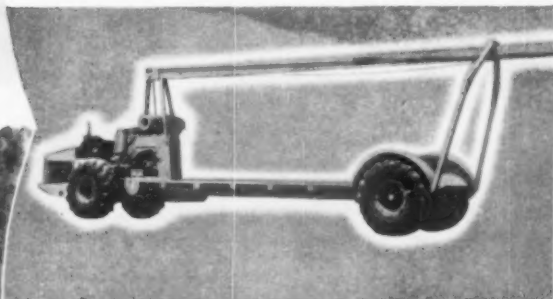
interchangeability



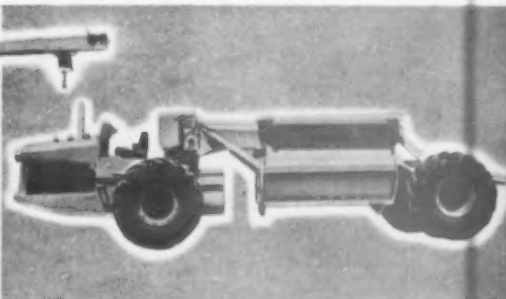
TOURNAPULL . . . C Roadster loads 13.5 cubic yards (capacity 16 tons). In any kind of scraper dirt on either long or short hauls, will beat all previous LeTourneau Scrapers in this size range for both output-per-day and cost-per-yard. Optional hauled units, bought as needed, cost \$4500 to \$7400, prime mover change takes only a few hours.



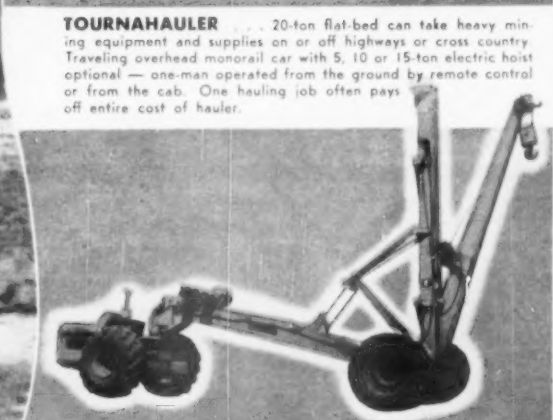
TOURNAROCKER . . . e revolutionary new rear-dump haul unit for use under shovel, dragline, conveyor or other loading equipment. Capacity 16 tons or 16.5 yards heaped. Big shovel target, 7' 10 1/2" x 11' 2" . . . 15' 11" wheelbase. Simple electric body hoist. Dumps clear over bank, tips vertical to clean fast. Turning radius 90° or 12 1/2'.



TOURNAHAULER . . . 20-ton flat-bed can take heavy mining equipment and supplies on or off highways or cross country. Traveling overhead monorail car with 5, 10 or 15-ton electric hoist optional — one-man operated from the ground by remote control or from the cab. One hauling job often pays off entire cost of hauler.



TOURNAHOPPER . . . bottom-dump hauler . . . 15-yards heaped, 16-ton capacity. Tournamatic differential, giant tires, and high clearance take it through muck and gumbo. Easy loading . . . top opening 8' x 8'. Easy to drive over windrows, clamshell-type dump-doors lift clear, give 22" clearance open. Turn radius 14'. 51% of loaded weight on drive tires.



TOURNACRANE . . . capacity, 15 tons with full maneuverability and travel with maximum loading. Maximum lift 35', reach 35'. Sliding boom on tilting track gives unique load maneuverability for structural repair and erection. Individual electric motors control each function independently. Reaches into "impossible" places . . . goes anywhere through sand, mud or gumbo.



TOURNAMIXER . . . transit-mix unit of 6 or 7 yards capacity ready to go anywhere on or off highway. Mixing speed 7 to 10 r.p.m. Two discharge speeds — 7 to 20 r.p.m. No need for chutes or elevators, Tournamixer dumps directly into forms at horizontal distance of 10' 7" back of wheels or at elevations from 4' 10" to 20' 8". All electric control from driver's seat.

LETOURNEAU
PEORIA, ILLINOIS



TOURNAPULLS

MORE YARDS PER HOUR WITH RUBBER-TIRED POWER

INDUSTRIAL DIVISION CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS



ATLANTA • DALLAS • MEMPHIS • NEW YORK



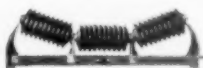
MANUFACTURERS

Conveyors, Elevators & Power Transmission Equipment

★ IDLERS FOR EVERY PURPOSE ★



STANDARD DUTY IDLER



RUBBER DISC IMPACT IDLER



RUBBER TIRED IMPACT IDLER



HEAVY DUTY IDLER



SELF-ALIGNING RETURN IDLER



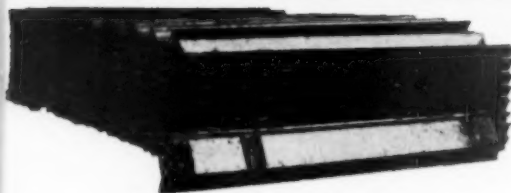
SELF-ALIGNING TROUGHING IDLER



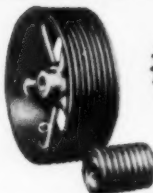
PICKING TABLE IDLER



SELF-ALIGNING FLAT BELT IDLER



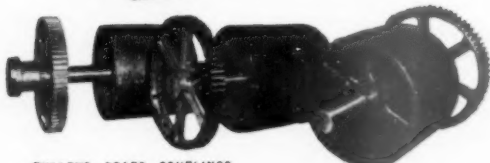
SHAKER CONVEYOR PANS & LINERS
CHAIN DRAG PANS



TRANSMISSION DRIVES



MINE CAR SPOTTING HOISTS



PULLEYS, GEARS, COUPLINGS

The above products are of Continental Meehanite—a superior product, insuring strength and long life.

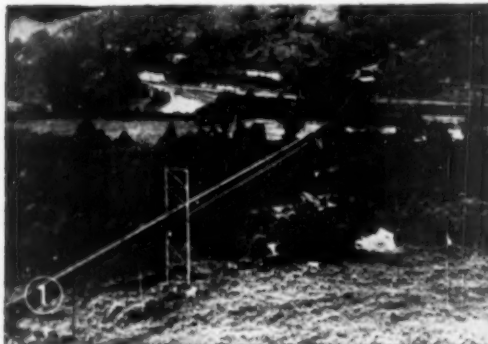
CG 49068

BELOW



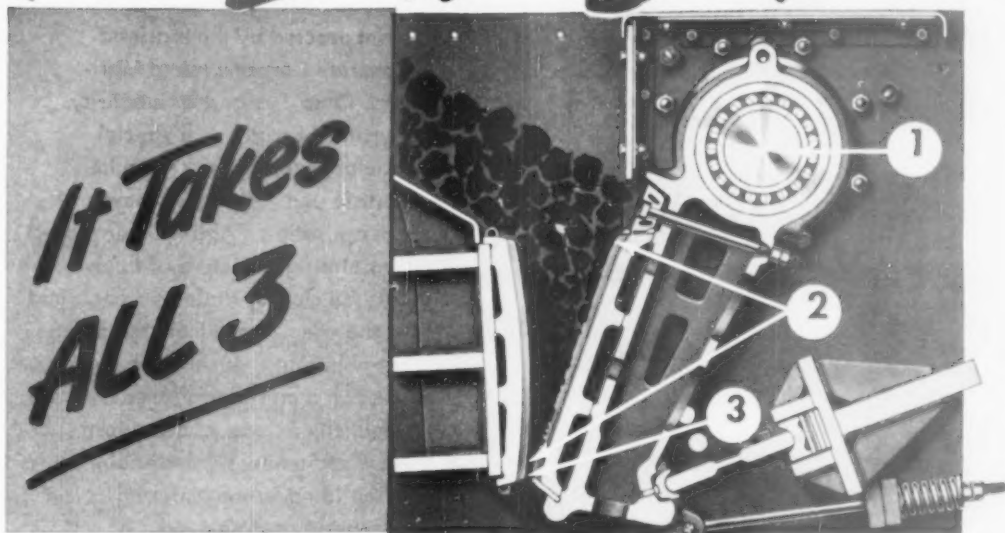
TYPICAL INSTALLATIONS
USING CONTINENTAL PRODUCTS

1. Overland coal haulage from mine tippie to shipping bin.
2. Belt conveyor hauling coal to tippie.



ALWAYS
Specify
CONTINENTAL

1 speed 2 long jaws 3 long stroke



to put the maximum amount of rock through a jaw crusher

A-W design takes full advantage of these basic requirements.

That's why these heavy-duty crushers turn out so much rock.

... and that's one big reason for the uninterrupted flow of material through the crushers and over the screens and conveyors of Austin-Western portable plants. No bottlenecks... no delays... just constant, high speed production.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.



"61"—For the smaller jobs where accurate grading of finished product is not required. Simple... economical... easily moved.



"201"—High output, portable gravel plant capable of producing especially large amounts of 3/4" and smaller product.



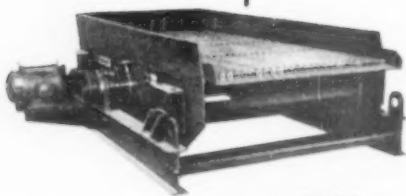
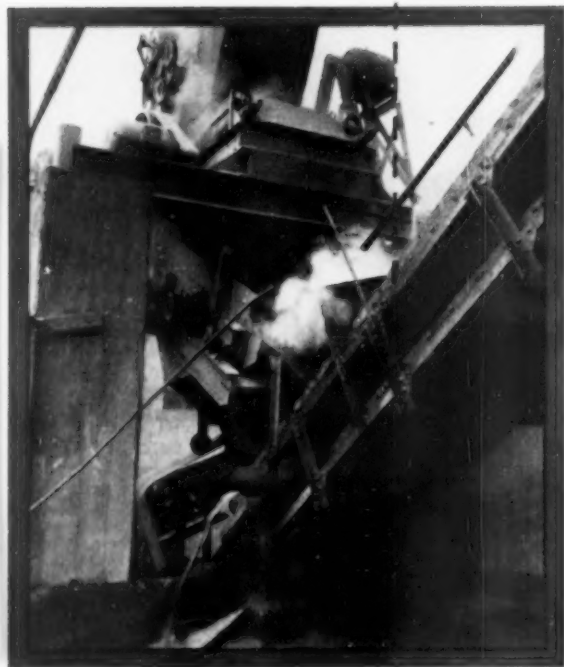
"101"—For contractors or counties needing extra large amounts of material. Equally useful in gravel and quarry service.



2-UNIT AND 3-UNIT PLANTS—Higher production than that of a single unit plant, thanks to larger crushers and multiple screens. Deliver several sizes of finished product.



Simplicity screen in operation at new Ohio "Aglite" plant



● "Aglite", a new lightweight concrete aggregate, is now being made on a production basis at a new \$250,000 plant erected by the Marietta Concrete Corporation at Marietta, Ohio . . . and a Simplicity Gyration Screen with special tubular scalping deck is an important unit in this new commercial operation. "Aglite" is produced by sintering a mixture of finely crushed clay or shale and coal, and as the cake comes from the 54'-long sintering machine, it passes through a crusher and then over the Simplicity Screen where return fines and minus $\frac{5}{8}$ " material used as bedding in the sintering operation are removed.

● "Aglite" has many features to make it an interesting factor in the lightweight aggregate field, and Simplicity Gyration Screens have all the features to do a top-notch job in every screening, sizing, or dewatering operation. Get all the facts and you'll get a Simplicity. A Simplicity sales engineer will be glad to study your problem and make equipment recommendations to do your job faster and more economically. Write us today.

SALES REPRESENTATIVES IN ALL PARTS
OF THE U.S.A.

FOR CANADA: CANADIAN BRIDGE
ENGINEERING CO., LTD.,
WALKERVILLE, ONTARIO.

FOR EXPORT: BROWN & SITES
50 CHURCH ST., NEW YORK 7

Simplicity
TRADE MARK REGISTERED

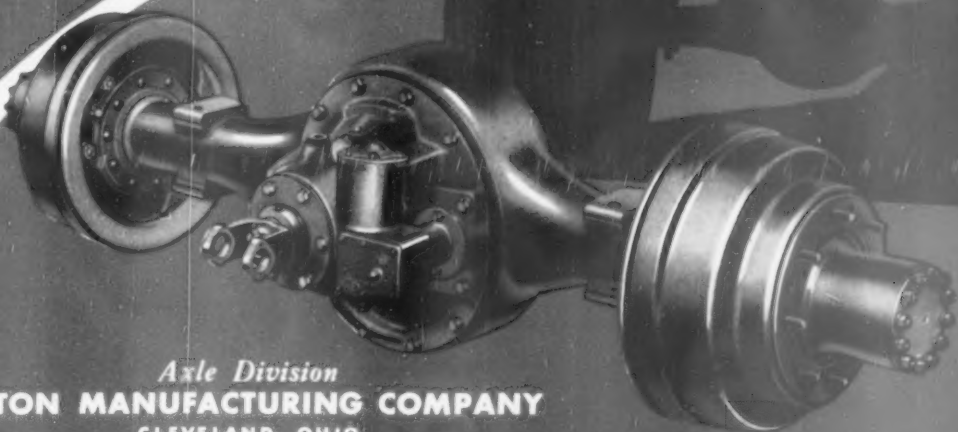
ENGINEERING COMPANY • DURAND, MICHIGAN

Extra Thousands of Trouble-Free Payload Miles with **EATON** *2-Speed Truck* **AXLES**



*More Than a Million
Eaton 2-Speed Axles
in Trucks Today*

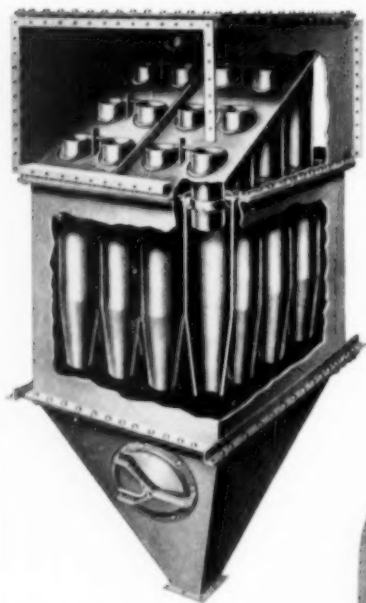
Even at slowest truck speeds—where gear tooth loads are often highest—Eaton's exclusive Forced-Flow Lubrication System provides positive protection for vital axle parts. With less than one revolution of the axle drive gear, oil begins to flow to all moving axle parts. As speed increases, flow is accelerated to meet the demand. This means reduced friction and wear, longer axle life and lower upkeep cost. Eaton 2-Speed Axles are available for most trucks of the 1½-ton class and larger. Ask your truck dealer for a road demonstration.



Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO



PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • IRI ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRING TITLES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS



In dust and
fly ash recovery

MULTICLONE COLLECTORS

and only Multiclones
give vital advantages
like these...



Uniformly High Recovery:

MULTICLONE's multiple small diameter tubes—made possible by its exclusive vane design—whirl the dirty gases with greater centrifugal force, thus throwing out not only the large, medium and small particles, but also a high percentage of the extremely small particles of 10 microns and less. This, coupled with the fact that there are no pads or filters to become choked with recovered material, results in a more complete recovery of all suspended materials from the gas stream.



Long and
narrow



Square

Maximum Adaptability:

In addition to its unusual compactness, the MULTICLONE is also unusually adaptable to various installation requirements. Where head room is low it can be installed with side-inlet side-outlet connections. Where side clearances are restricted, it can be installed with side-inlet top-outlet connections. In addition, without changing capacities, the shape of the unit can be varied—long and narrow, short and wide, or square—to fit restricted spaces—and its single-inlet single-outlet duct requirements permit greater flexibility and simpler installation. These savings slice installation costs, space requirements and insulating expense.

Space-Saving Compactness:

Plant space costs money—so be sure to check space requirements carefully. As shown in the accompanying chart, the MULTICLONE requires less floor space and less cubic space than any other unit of comparable capacity and performance. Translate these savings into today's high costs for plant space and you readily see the great importance of this one MULTICLONE advantage alone!

Make	Space Requirements in Sq. Ft. to Cu. Ft.	
	Multiclone	Other
Collector A	1.0	1.8
Collector B	2.1	3.2
Collector C	5.0	5.9

Minimum Maintenance:

The MULTICLONE has no high speed moving parts to repair or replace... no pads or filters to clean or renew... nothing to choke the gas flow or increase draft losses as suspended materials are recovered. MULTICLONE draft losses remain uniformly low at all times. Further, the recovered material from an entire bank of tubes is collected in a single hopper—far easier to service and maintain than the multiple hoppers of conventional cyclone units.



FREE INFORMATIVE BOOKLET

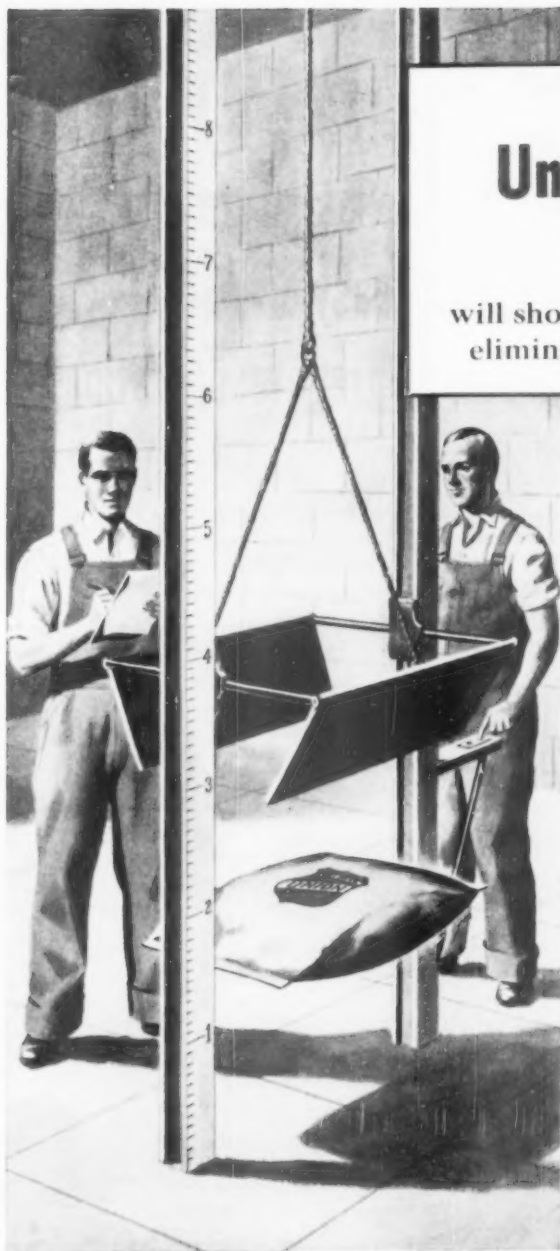
This 32 page booklet outlines the basic principles of centrifugal dust recovery and shows the many ways MULTICLONE advantages assure higher recovery at lower overall costs. A free copy of this booklet will gladly be sent on request. Write today!

Before you decide on any recovery equipment be sure to get complete information on MULTICLONE advantages. A letter, wire or phone call to our nearest office places this information in your hands without obligation. Get all the facts and you will get MULTICLONE Collectors!

WESTERN Precipitation CORPORATION

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR
COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1000 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
CHRYSLER BLDG., NEW YORK 17 • 145 SALLE ST. BLDG., 14 N. 14 SALLE ST.,
CHICAGO 2 • ROBERT BUILDING, SAN FRANCISCO 4, CALIFORNIA
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL



Your Union Multiwall Specialist

will show you how quality control
eliminates customer complaints!

SHIPPERS of more than 300 different products find Union Multiwall Bags reduce customer complaints and losses in shipping and handling. They are custom-designed with reserve strength for hard knocks.

Continuous testing in Union Laboratories leaves nothing to chance. Bag paper is tortured and torn, burst and frayed. Loaded bags are dropped and tumbled and scuffed to discover any weak points, any need for strengthening.

Union Quality Control checks and rechecks every step in the making from timber to finished bag.

This constant checking and testing is a safeguard for every order of Union Multiwall Bags. So when your Union Multiwall representative calls on you, tell him the requirements of your product, its shipping and handling. You can be sure your delivered bags will live up to specifications.

Even if you are now using multiwall bags, your Union representative can give you new ideas on bag construction, packaging and handling that will save you money. So welcome him when he calls!



Multiple Protection



Opens Easily



Prevents Siftage



Empties Clean

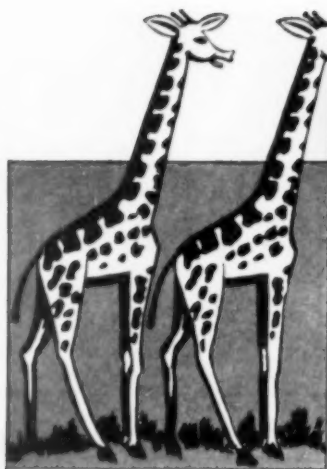
UNION Multiwall Bags

UNION BAG & PAPER CORPORATION

233 BROADWAY, NEW YORK 7, NEW YORK

Offices in: CHICAGO, ILL. • NEW ORLEANS, LA. • MINNEAPOLIS, MINN. • KANSAS CITY, MO. • HOUSTON, TEXAS





TWIN 1½ yard

Bay City cranes make stockpiling easy in Michigan aggregate operation

The Northville Sand and Gravel Co. of Northville, Michigan has found, like many other concerns, that the well balanced flexibility of the BAY CITY Model 65 *speeds stockpiling and material handling*. Efficient performance is assured through E-Z control booster clutches, tandem drums for direct cable lead and helical cut gears for quiet smooth operation. See the Model 65 at your nearest BAY CITY dealer or write for our Bulletin 65D. BAY CITY SHOVELS INC., BAY CITY, MICHIGAN.



BAY CITY



SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

The Work Horse in the packaging field

BEMIS MULTIWALL PAPER SHIPPING SACKS



They're tough and sturdy...have plenty of reserve strength even when packed with such heavyweights as cement or fertilizer.

Bemis uses top quality kraft paper. Each of the three or more plies has been tested for the kind of work it must do. So, there is never any question. It's sure to do the job.

Seven Bemis Multiwall Plants are ready to team up to give you service in an emergency or to provide a dependable source of supply.

Bemis



Portland, Me. • Mobile, Ala. • Houston, Texas
Fort Pepperell, Mass. • San Francisco, Calif.
Vancouver, Wash. • Wilmington, Calif.

Billings • Boise • Denver • Dallas • Dallas • Chicago
Charlotte • Cleveland • Dallas • Seattle • Springfield, Pa.
Indianapolis • Kansas City • Los Angeles • Louisville
Memphis • Minneapolis • New Orleans • New York City
Oklahoma City • Omaha • Phoenix • Pittsburgh
St. Louis • Tulsa • Salt Lake City • Seattle • Wichita



2400 hours of operation-routine maintenance only - that's PLYMOUTH

Put a rugged, well-engineered PLYMOUTH LOCOMOTIVE into operation and UP goes efficiency - down go hauling and maintenance costs!

Hauling twelve gondola cars brimful with strength-testing loads of crushed stone is the 48-hour-per-week assignment given to this 65-ton Plymouth Diesel by the Consumers Company, McCook, Illinois. In a full year of economical performance this powerful locomotive has required NO maintenance except normal operational care.

Today Plymouth Locomotives are busy at work in steel - chemicals - oil - lumber -

power - mining . . . gasoline, diesel, and diesel-electric models ranging in size from 2½ tons to 70 tons, built for standard and narrow gauge rails, have established an enviable reputation for long, satisfactory service in countless American industries.

Plymouth cost-cutting advantages can fit profitably into your operation. Write for the new Plymouth catalog . . . and take a moment to outline your hauling requirements. Address: Plymouth Locomotive Works, Division of The Fate-Root-Heath Company, Dept. A-5 Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES
GASOLINE, DIESEL, AND DIESEL ELECTRIC
PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.



Top performance for tough jobs!

Chevrolet P*L Truck performance consists of many things. There is Chevrolet design—brilliant and functional—design with a purpose. There is Chevrolet construction—sturdy and dependable—for lasting usefulness.

And there is Chevrolet power—power to deliver the goods—more power than Chevrolet trucks ever had before. Two great valve-in-head engines—the Load-Master 105 h.p. and the Thrift-Master 92 h.p.—make these the most powerful Chevrolet trucks ever built.

These new P*L models are far ahead in features, too; yet they cost surprisingly little to buy, to operate, to maintain. And that adds up to value—the kind of outstanding value that year after year makes Chevrolet America's fastest selling truck.

CHEVROLET MOTOR DIVISION, General Motors Corporation, DETROIT 2, MICH

LEADING WITH ALL THESE PLUS FEATURES:

- TWO GREAT VALVE-IN-HEAD ENGINES: the New 105-h.p. Load-Master and the Improved 92-h.p. Thrift-Master—to give you greater power per gallon, lower cost per load
- THE NEW POWER-JET CARBURETOR: smoother, quicker acceleration response
- DIAPHRAGM SPRING CLUTCH for easy action engagement
- SYNCHROMESH TRANSMISSIONS for fast, smooth shifting
- HYPOID REAR AXLES—5 times more durable than spiral bevel type
- DOUBLE-ARTICULATED BRAKES—for complete driver control
- WIDE-BASE WHEELS for increased tire mileage
- ADVANCE-DESIGN STYLING with the "Cab that Breathes"
- BALL-TYPE STEERING for easier handling
- UNIT-DESIGN BODIES—precision built.

CHEVROLET P*L*

ADVANCE-DESIGN TRUCKS

Popularity Leaders*

Chevrolet trucks outsell all others. In every postwar year truck users have bought more Chevrolets than any other make—proof of the owner satisfaction they have earned throughout the years.

Performance Leaders*

The new Chevrolet P*L trucks give you high pulling power over a wide range of usable road speeds—and on the straightaway, high acceleration to cut down total trip time.

Payload Leaders*

The rugged construction and all-around economy of Chevrolet P*L trucks cut operating and repair costs—let you deliver the goods with real reductions in cost per ton per mile.

Price Leaders*

From low selling price to high resale value, you're money ahead with Chevrolet trucks. Chevrolet's rock-bottom initial cost—outstandingly low cost of operation and upkeep—and high trade-in value, all add up to the lowest price for you.



Another Example of
Why Leading Contractors
Prefer Lippmann Equipment

Crushes A MILE-LONG TRAINLOAD OF HARD LAVA ROCK PER DAY!

**Lippmann 36x48 GRIZZLY KING, World's Largest
Overhead Eccentric Jaw Crusher, Hits Amazing Peak
of 5700 Tons per Day for Big Colorado Quarry.**

36 x 48 GRIZZLY KING was fed by two 2-yard shovels, reduced hard lava rock to minus 6 in. at 360 tons per hour. Lippmann Jaw Crushers have extremely low power consumption, have never had a shaft or bearing failure with proper maintenance.

On large jobs or small, more and more experienced operators are using Lippmann equipment. Take the case of the big Colorado quarry that was awarded a huge contract to make aggregate from lava rock so hard that ordinary steel drill bits would not do the work and carbide tips had to be used.

This contractor, despite a slow start because of bad weather, wound up his first season comfortably ahead of schedule. To do this, he operated his 36x48 Lippmann GRIZZLY KING Jaw Crusher two eight-hour shifts . . . hit a peak of 360 tons per hour . . . 5700 tons per day!

Blast-run rock was fed on a Lippmann Super-Duty Feeder to the crusher. GRIZZLY KING'S extra-long jaws, engineered crushing action, complete oil lubrication and alloy steel construction provided the tremendous capacity required at extremely low maintenance costs. (Actually only a few bolts were replaced during the entire seven month

season; no die replacements, even with this highly abrasive rock.)

Other high-capacity, low-maintenance Lippmann-engineered equipment on this huge job includes five Screen-All Vibrating Screens with sharper sizing action . . . 12 Lippmann Belt Conveyors whose Life-Sealed Ball Bearing Idlers never require added lubrication . . . six sturdy Lippmann bins.

You, too, can profit by the experience of the country's leading contractors who choose Lippmann over all other makes. Lippmann engineering means higher capacity at lower cost . . . more efficient operation with less maintenance.

OTHER 36x48s PROVE REAL MONEY MAKERS

- Replacing a competitive unit, GRIZZLY KING balanced designed allowed an Indiana quarry to double its output with the rest of the equipment unchanged. Increased production will pay the entire crusher cost in two years.
- On a hard limestone job in Tennessee, balanced design of GRIZZLY KING has crushed 2,500,000 tons in two years without a single jaw die replacement.
- In a Canadian hard limestone quarry, GRIZZLY KING 36 x 48 produced half a million tons of minus 3½ in. stone in first six months' operation. Balanced design kept jaw dies "looking like new."

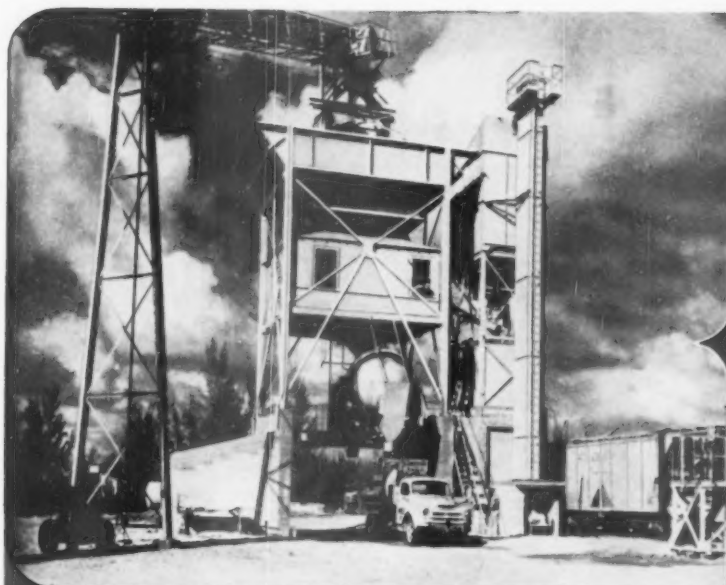
NOTE ABSENCE OF CATWALKS on these Lippmann Belt Conveyors in the Colorado quarry. That's because Life-Sealed Ball Bearing Idlers need no added lubrication or periodic alignment, a tremendous grease and labor saving.



FOR ALL THE FACTS on the complete Lippmann line for pits, mines and quarries write for: Grizzly King Jaw Crushers (Bulletin 11001), Screen-All Vibrating Screens (12001), Pulverizers (13100), Belt Conveyors (14001), Gyrus Gnome Secondary Crushers, Circuit Rider Self-Propelled Crushing Plants, Portable Washing Plants, Apron Feeders (1450).

LIPPMANN ENGINEERING WORKS

4603 West Mitchell St., Milwaukee 14, Wisconsin



MODERN **ERIE** Wet and Dry Batch Concrete Plant

Plant includes Type CTB 160 Cu. Yds. 3-Compartment Aggre-Meter Plant connected to an M-3 492 Bbl. Single Compartment Cement Plant loaded from under-track hopper to 50 T.H.P. Elevator. This 3 yard wet and dry batch Central-Mix Plant produces up to 500 yards of concrete per day to supply the Miami market.

MAULE INDUSTRIES of MIAMI

Produce better CONCRETE, faster and at LOWER COST

PRECISION batching of high grade materials assures the high quality of specification concrete. The combination of efficient handling and accurate batching speeds concrete output and lowers cost. Consult Erie for thrifty storage and batching of cement, sand and aggregates.



Barges of sand and reduced oolitic limestone are unloaded by clamshell into hopper and belt conveyed to 3-Compartment Erie Bin.

ERIE

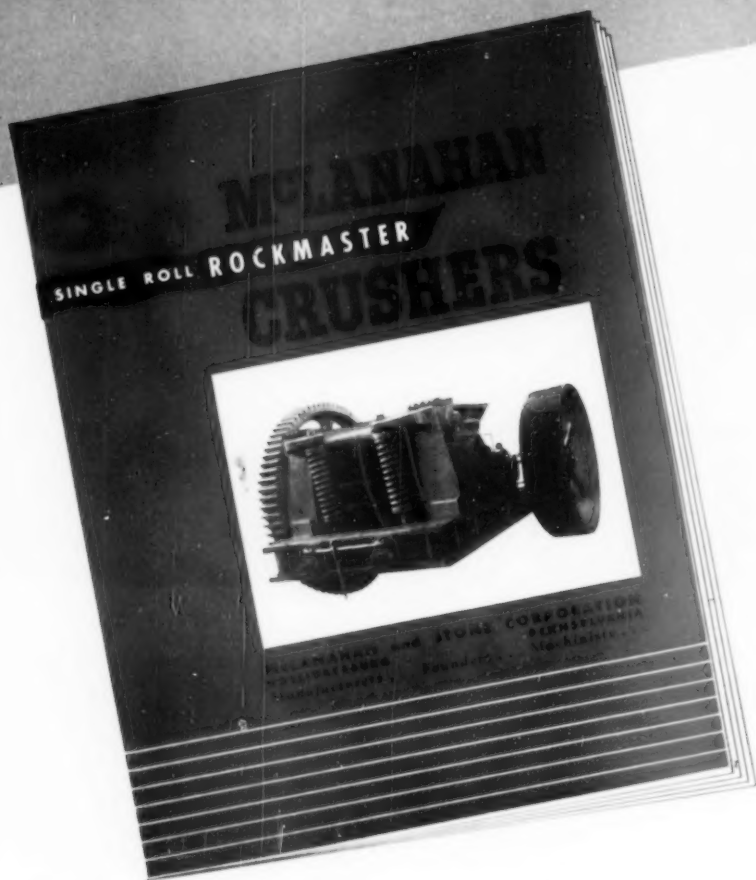
STEEL CONSTRUCTION COMPANY

706 GEIST ROAD • ERIE, PENNSYLVANIA



ROCK PRODUCTS, June, 1950

MODERNIZING YOUR OPERATIONS?



WRITE, PHONE or WIRE for this NEW BULLETIN

Here in this new bulletin are shown for the first time the very latest developments in heavy duty Rockmaster Crushers. Capacity charts, technical information—*everything* you will want to know if you are planning replacements or modernization.

McLANAHAN & STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835

HOLLIDAYSBURG, PENNSYLVANIA

NEW and Heavy-Duty Engineered TO SAVE YOU MONEY



Whether you haul coal or rock, sand or gravel

You get lower-cost performance, more miles of trouble-free hauling, and longer life from every new International Truck because every new International Truck is **HEAVY-DUTY ENGINEERED**.

Proof of this statement boils down to this:

1. Heavy-duty truck buyers keep records of hauling costs right down to the last penny. On the basis of what these records show, these cost-conscious men have bought more heavy-duty International Trucks than any other make for 18 straight years.
2. The extra values that for almost two decades have assured America's most exacting truck buyers of better performance at lower cost per mile are engineered into every new International Truck from the smallest to the largest.

Every new International Truck from 4,200 to 90,000 pounds gross vehicle weight offers heavy-duty engineered stamina and operating economy combined with new comfort and ease of handling.

You get new comfort and driving ease in the "roomiest cab on the road." Step into the Comfo-Vision Cab

and discover how much more "move-around room" there is in the "roomiest cab on the road." Note how easy it is to adjust the wide seat to just the right position.

Look out through the one-piece, scientifically curved Sweepstake windshield. Place your hands right where they feel natural for driving—and you'll find them gripped around the sturdy steering wheel. And just wait till you start going—you'll enjoy more positive control... thanks to new Super-steering.

You get more all-round truck value in every new International Truck. See the new valve-in-head truck engines, new rear axles, new features throughout—all proved under actual operating conditions. Get the facts about new Internationals—the world's most complete line of trucks.

See for yourself... see your International Truck Dealer or Branch, soon.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors... Motor Trucks... Industrial Power... Refrigerators and Freezers

Tune in James Melton and "Harvest of Stars"—NBC, Sunday afternoons



ALL NEW, ALL PROVED

INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY CHICAGO

ROCK PRODUCTS, June, 1950

DU PONT ANNOUNCES "NITRAMEX" No. 2

for
quarry and open-
pit blasting



Charges of "Nitramex" No. 2 are detonated with a "Nitramon" Primer. Note ingenious method of securing "Primacord."

"Nitramex" No. 2 is another product of Du Pont Explosives Research . . . introduced now after extensive field tests have proved its value in blasting both rock and ore. It fulfills the need for a high-density blasting agent that develops its pressure more slowly, yet offers all the safety factors of "Nitramex," which has been used so successfully in ore and quarry applications.

The slower development of pressure . . . characteristic of "Nitramex" No. 2 . . . produces a better spreading action, giving more uniform fragmentation under a wider variety of conditions. This action frequently allows an increase in spacing and burden with as good or better frag-

mentation, saving both drilling and blasting costs.

The introduction of "Nitramex" No. 2 rounds out the line of "Nitramon" and "Nitramex" blasting agents and marks another step forward in the Du Pont Company's program for safer blasting in quarries and open pits.

Ask your Du Pont Explosives Representative about this new, more effective blasting agent. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

DU PONT "NITRAMEX"

Not currently for sale in the western states.

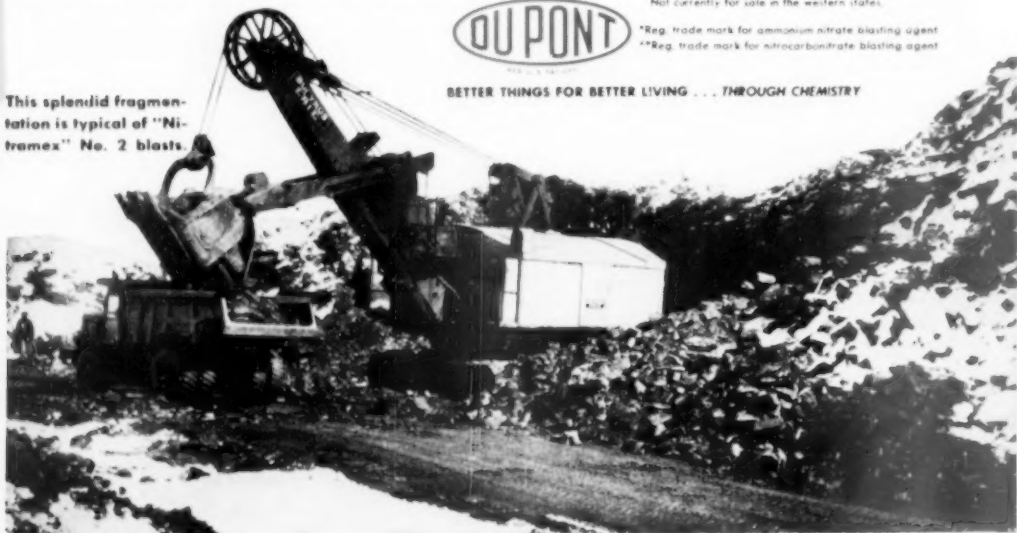


*Reg. trade mark for ammonium nitrate blasting agent

**Reg. trade mark for nitrocarbonate blasting agent

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

This splendid fragmentation is typical of "Nitramex" No. 2 blasts.



Now... Available in Larger Sizes!

HYDROCONE^{*} (Type R) CRUSHERS

^{*}The term "Type R" by which these Allis-Chalmers crushers have been known has been changed to "Hydrocone." "Hydro" denotes the use of a static liquid, such as oil, used in the Hydrocone crusher for supporting and adjusting the height of the crushing cone. The principle of operation has not been changed.

TO MEET new requirements for fine crushing in a larger range of capacities, Allis-Chalmers offers the expanded line of *Hydrocone* crushers, in sizes up to 1784 (17-in. receiving opening; 84-in. diameter cone) with coarse, intermediate or fine crushing chambers.

In the *Hydrocone* design the crusher's main shaft is raised or lowered hydraulically (push-button operation on the larger sizes) permitting quick, accurate product size adjustment without stopping the crusher. An Automatic Reset device lowers the entire crushing head hydraulically to pass uncrushable materials.



- ▶ Wobble plate feeder distributes feed evenly — standard equipment for crushers with fine crushing chambers.
- ▶ Spiral bevel gears, anti-friction bearings and improved clean oil lubrication. Smooth operation; long life!
- ▶ Simplicity of design reduces maintenance costs substantially.

Get the complete facts about *Hydrocone* crushers — in sizes 122 to 1784 — from the Allis-Chalmers representative in your area.

A-2933

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.

Texrope and *Hydrocone* are Allis-Chalmers trademarks.

ALLIS-CHALMERS



Sales offices in principal cities in the U. S. A. — Distributors throughout the world.

IT PAYS TO SPECIFY MOTORS...
CONTROLS... V-BELT DRIVES — ALL
FROM ALLIS-CHALMERS



Motors — Controls



Texrope Drives



Vibrating Screens



Jaw Crushers



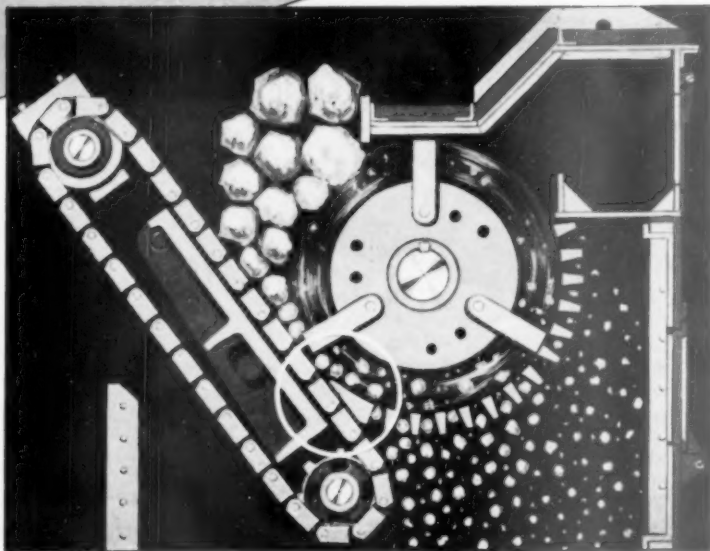
Kilns, Coolers, Dryers



Gyratory Crushers

THE ONE and ONLY
NON-CLOG
 The Tried and Proven
DIXIE Hammermill

Better crushing begins here! Cross section drawing illustrates "heart" of Dixie Non-Clog Hammermill where Extended Moving Breaker Plate construction guards against passage of oversize material... results in improved grinding control for unvarying uniformity of product.



Your ASSURANCE of GREATER PRODUCTION at LESS COST

The one and only Dixie NON-CLOG Moving Breaker Plate Hammermill* sets a new standard of crushing efficiency in the reduction of wet, sticky materials.

If you have wet, sticky material to crush, if you have difficulty in reaching and maintaining desired production, if you have any crushing problem at all, it will pay you to take advantage of this vastly improved crushing principle.

* U.S. Patents
Granted & Pending

Dixie Non-Clog Hammermills are made in sizes ranging from 24" up to 72" diam.

WRITE TODAY FOR COMPLETE DETAILS

DIXIE **MACHINERY MFG. CO.**
 MAIN OFFICE AND PLANT
 4202 Goodfellow Ave., St. Louis 20, Mo.



DIVIDE BY TWO— and GET MORE than you had before

FUEL consumption was cut in half and production doubled when a 4-cylinder GM Series 71 Diesel replaced gasoline power in this Northwest one-yard shovel.

The machine handles 1200 tons of limestone and uses only 35 gallons of fuel oil in an 8-hour day, as compared to 600 tons using 75 gallons of gasoline with the old engine. R. W. Meyer, president of Riverview Stone & Material Co., St. Louis, reports moving 400,000 tons of rock without engine overhaul.

"Not only did the General Motors Diesel engine

drastically reduce fuel costs," says Mr. Meyer "but operating speed stepped up considerably. This 15-year-old machine walks right through in tight rock now."

Taking jobs like this in stride is everyday work for GM Diesel-powered equipment. The 2-cycle GM Diesel gives lightning response to power demands, operates on low-cost fuel, and delivers long, economical service.

You'll find it pays to specify GM Diesels for repowering old equipment or when buying new. Write us or ask your distributor for details.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES ... Up to 275 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS ... Up to 800 H.P.
GENERAL MOTORS



DIESEL BRAVN WITHOUT THE BULK



"THE BELT WITH A DOUBLE LIFE"

QUAKER TRANSMISSION BELTING LASTS 10 YEARS . . . CUTS COSTS IN HALF !

Day and night for six years . . . regular running for more than four years. That's the service record of an eighteen inch, six ply Quaker Ironsides Endless Belt on a forty foot drive powered by a 150 horsepower steam engine. Twice the length of service of any other belting . . . a saving of more than \$400.00.

More proof of why more plants are specifying Quaker for quality. Each and every Quaker Belt is designed for a par-

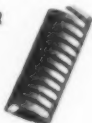
ticular job . . . pre-tested and performance proved for maximum service and lower operating costs.

That's why you'll find so many drives equipped with Quaker Belts throughout the Rock Products Industry.

For less wear, stretch and slippage . . . for positive power transmission Quakerize your drives. There's a Quaker flat belt or V-Belt for every industrial need. Write for complete catalog.

PACKINGS THAT PRESERVE POWER

Quaker packings are pre-tested for size, shape and quality to assure perfect fit, long service, maximum power.



HOSE FOR RUGGED WEAR

Pre-tested and performance proved for flexing and strength, there is a Quaker Hose for air, steam, liquids.



QUAKER RUBBER CORPORATION • PHILADELPHIA 24, PA.

Division of H. K. Porter Company, Inc.

Pittsburgh • New York • Cleveland • Chicago • Houston • Atlanta

Western Territory

QUAKER PACIFIC RUBBER CO. • San Francisco • Los Angeles • Seattle

QUAKER RUBBER PRODUCTS

custom made for every industrial use





IT'S A SHOVEL

Model HM
4-WHEEL DRIVE
PAYLOADER
SPEED—
POWER—
TRACTION—
Versatility

The Model HM Payloader is a complete Hough-built unit... a powerful 1½ cu. yd. tractor shovel with large pneumatic tires, 4-wheel drive and four speeds in each direction. It has the power, traction and flotation to work on all kinds of ground... to dig, load, carry, grade, level and spread... converts in a few minutes to a bulldozer, a crane, or a "V" snowplow. Not a fair weather worker, but a year 'round tool.

HM versatility is backed by many other outstanding Payloader advantages... power-booster steering, 76 h.p. gasoline or diesel engine, double-acting hydraulic boom and bucket control, unequalled operator comfort and visibility. The complete HM Payloader story is yours for the asking. See your Hough Distributor, or write The Frank G. Hough Co., 705 Sunnyside Avenue, Libertyville, Illinois.

SEND for HM catalog, or literature on other Payloaders — the 1¼ yd. Model HL, the ½ yd. HP, the ⅓ yd. HE, the 12 cu. ft. HA.



A BULLDOZER



A CRANE



**HOUGH
PAYLOADER**

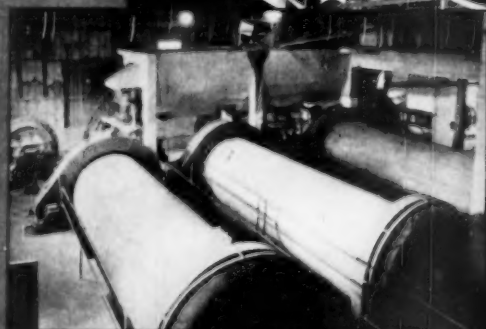
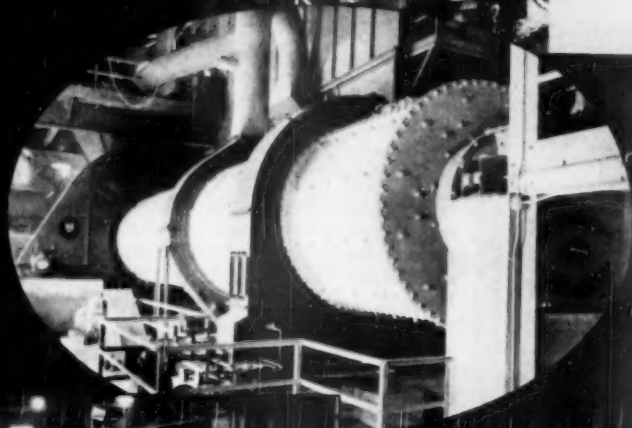
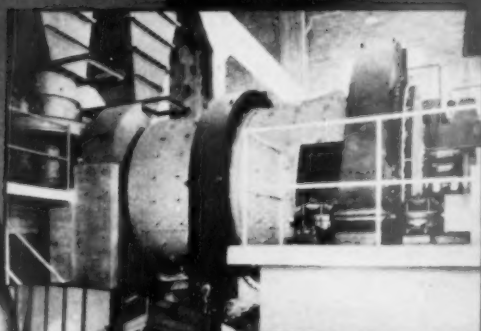
Manufactured by THE FRANK G. HOUGH CO.



GRINDING MILLS

GRANULATORS

BALLMILLS
KOMINUTERS



MULTI-COMPARTMENT MILLS

UNIDAN
UNI-KOM
TIRAX

PULVERIZERS

TUBEMILLS
ATOX MILLS



F. L. SMITH & CO.

11 WEST 42ND STREET

Engineers

NEW YORK, N. Y.

"WE HEAR..."

June, 1950

All highway construction dollar volume records are being shattered this year, with \$1,446,732,000 in road improvements--exclusive of maintenance--going into place on the systems of the 48 states and the District of Columbia. A state-by-state survey made by the American Road Builders' Association shows a 15 percent increase this year over 1949's previous record road construction total of \$1,262,506,000. Of the 1950 improvements, 1,718 miles of concrete, 29,977 miles of bituminous mixes and treated types and 14,981 miles of other types of highway materials (gravel, etc.) are programmed for construction.

Two English china-clay companies have reported that they are producing a type of prefabricated house--"Cornish Unit Dwellings"--in which the concrete sections have an aggregate of pure white china-clay sand.

More job openings became available in April. The Census Bureau's report of employment shows that 58,668,000 persons had work--1,117,000 more than in March and 849,000 more than a year earlier. Unemployment, which declined slightly in March, showed a further drop, totaling 3,515,000 in April. Total of employed and unemployable swelled the labor force to 62,183,000 persons--1,348,000 more than a year ago.

Preliminary results of research on the use of lime-fly ash compositions in highway construction indicate that the addition of fly ash, a pozzolanic material, to certain soils which are deficient in pozzolana improves the effectiveness of lime in stabilizing these particular soils. Because fly ash is so extremely low in cost, its addition with lime is economically feasible, and the combination of these two materials may achieve satisfactory base stabilization on some soils that do not respond to straight lime treatment, Limeographs reports.

Three hitherto unknown uranium minerals have been identified by the Department of the Interior. They were found in a coating on gypsum at the 300-ft. level of the Hillside Mine in Yavapai County, Ariz., together with another rare uranium mineral previously found only in Wyoming and Czechoslovakia. The minerals were found in only one place--as a coating about 1/4-in. thick on gypsum in the oxidized zone, and about 40 ft. above the water level.

Construction contracts totaling more than \$105,000,000 will be let by Army Engineers of the North Pacific Division during 1950 for work in Alaska. The 1950 program, consisting entirely of work for the military establishment, will be more than twice the \$46,000,000 worth of awards made during 1949.

Despite the rapidly accelerating boom in construction business throughout the country, there is not and will be no major shortage of construction machinery, an Engineering News-Record survey indicates. And business is very good--one company reported that it was doubling production capacity to keep up with the demand. The survey took up more than 30 individual construction machinery items ranging from small power units to cranes, shovels and large earthmoving units including scrapers and trucks.

WE HEAR

A California company has utilized the considerable heat of hydration of quicklime as a means of heating canned foods! The firm's product consists of a can of food enclosed in a larger can. The space between the two cans is filled with granular or pulverized quicklime and both cans are hermetically sealed. Campers, hunters or other people wanting a quick lunch simply punch holes in the top of the can at points indicated, and pour a small amount of water through them. The quicklime immediately starts to hydrate, and is capable of heating the food to 180 deg. F. The smaller can is then removed and opened with its contents ready to serve. Four ounces of quicklime are required for each can. It is estimated that sales will reach 10,000,000 cases per year.

Quality of construction in both housing and other building has reached a new high level for the mass production age, according to the Producers' Council. Greater use of mechanized equipment in on-site construction, the long list of new and improved building products, and continuing improvements in design all have contributed to this.

Freight car loadings in the second quarter of 1950 are expected to be 1.4 percent above those in the same period of 1949, according to the 13 Regional Shippers Advisory Boards. Increases are expected to come from the New England, Eastern, Southeastern, Midwest and Pacific Northwest territories.

Just before making known to government officials his decision to abdicate political and underworld leadership in Kansas City, Mo., Charles Binaggio, Democratic boss, was found shot to death. He had planned to retire from the local scene by entering a legitimate business. A few days after his death he was to have gone to Santa Fe, N. M., to complete arrangements whereby he was to invest between \$50,000 and \$100,000 in the manufacture of concrete block from deposits of pumice stone near Albuquerque, according to newspaper reports.

Successful preliminary road tests of the world's first gas turbine-powered truck, using the experimental Boeing 175-hp., lightweight turbine have been completed in Washington. Use of this type power unit is said to eliminate a cooling system, eliminate much gear shifting, provide for immediate starting under full power with a "warm-up" period, and do away with "stalling" engines.

An employer cannot count on getting N.L.R.B. to hold a collective-bargaining election among his employees if he engages in unfair labor practices to undermine the union before the vote. The Board turned down the petition of one employer for an election and ordered him to bargain with a union whose majority was never questioned. The Board objected to a threat by the employer to close his plant if the union won and also to his promise to do better for the employees if the union lost.

Construction expenditures on U.S. airports rose markedly during 1949. Figures point to a construction outlay exceeding \$100,000,000 for the year. In 1949, Civil Aeronautics Authority paid out \$46,300,000 for work accomplished on airports--more than twice the \$21,900,000 expended the previous year. Matching fund expenditures by local project sponsors ran ahead of C.A.A. payments.

Reduction of the maximum interest rate on F.H.A. home mortgages to 4 1/2 percent has been announced by the Housing and Home Finance Agency and Federal Housing Administration. It was said that this lower rate would be effective in producing a higher level of residential construction under the F.H.A. program.

A Nebraska concrete products firm recently filed a \$23,119 damage suit against an Eastern cement company charging that it was shipped the wrong type of cement, resulting in a loss of the amount named in the suit. The petition alleges that an agreement was made between the two companies that if a substitution were made in a shipment, advance notice would be given.

THE EDITORS



Fit Thermoid Quality and Experience into Your Belting Picture

Thermoid high quality stems from continuing research and product development. To complete this picture, your Thermoid distributor and the Thermoid field representative, working as a team, offer you practical experience in solving your particular problem.

Whether it's run-of-the-mill or something "special", your Thermoid distributor can help you select the right Thermoid Conveyor Belt. And the down-to-earth advice of Thermoid field representatives is welcomed by men faced with belting trouble in mining, quarrying and construction operations. They know this advice is the result of day-by-day experience with conditions *in the field*.

If your belting fails prematurely—if you're stumped with a tough belting problem—call your Thermoid distributor. Together with the Thermoid field representative, he can help you get greater economy, efficiency and tonnage for your belting dollar.

**It Will Pay You to
Specify Thermoid**

Thermoid Quality Products: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Molded Products • Industrial Brake Linings and Friction Materials.

**Thermoid
Company**

**Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U. S. A.
Industrial Rubber Products • Friction Materials • Oil Field Products**

DEPENDABLE

is the word that best describes

**KRAFT made-to-order
heavy-duty multi-wall
shipping sacks**

produced in our new plant at St. Marys, Georgia

DEPENDABLE bag paper... made to exacting specifications in our own mill

DEPENDABLE bag design... by our own practical packaging engineers

DEPENDABLE workmanship... by personnel with long experience in multi-wall bag construction

DEPENDABLE plate-making, and dependable printing with improved presses and inks

DEPENDABLE deliveries and service... by rail or water right from our own doorstep.

• Sewn or pasted—valve or open mouth—2 ply or up to 6 ply... you can depend on "Kraft" both as a source of supply and as a source of complete satisfaction.

KRAFT BAG CORPORATION

A DIVISION OF GILMAN PAPER CO.

630 Fifth Ave., New York 20, N.Y.
Western Sales Office
Daily News Bldg., Chicago 6, Ill.

Gilman
PAPER CO.
• St. Marys Kraft Corp.
• Commercial Paper Div.
• The Cellulose Corp.
• Kraft Bag Corp.

The long, white building in the foreground is the newly completed addition to the Kraft Bag Corporation's plant in St. Marys, Georgia

Send your product to market in a "KRAFT BAG"—the container for a thousand uses!

Editor's Page

A Planned Program for Industry Research

THE PORTLAND CEMENT ASSOCIATION has just dedicated new research and development laboratories which are the largest in the world for research exclusively on portland cement and concrete. These facilities and the organization plan for an enlarged staff of specialists to do research are a result of the portland cement industry's progressiveness and foresight. The approach to research is based on sound principles which would benefit any program for scientific study expected to develop really useful results.

For one thing, it has been recognized that basic studies of cement and concrete have lagged far behind the accumulation of data on the subject. Emphasis more than ever before is on *reasons why* concrete behaves as it does in order to arrive at explanations for inconsistent performance and ways to better the ultimate product, rather than on specific information as obtained directly from tests.

There are many universities and other agencies doing research on concrete, and there has been great progress from their efforts notably in extending the uses of concrete, but very few projects now under study indicate that new approaches to long-standing problems are being sought. Research by traditional methods has resulted in the collection of voluminous data on specific subjects like durability of concrete, to mention one with a real challenge, but the need is obviously more for the ability to interpret data correctly rather than on assembling still more data.

Unless that be accomplished, there will continue to be many new theories and unproved conclusions that will only serve to muddle the problems.

The Portland Cement Association is set up, by personnel, organization and equipment for more research of the fundamental type throughout its several research departments, to develop proved facts on why materials behave as they do, which facts then will be applied through further scientific study to the improvement of concrete. That approach should be given more emphasis in any sound plan for research.

Guaranteeing Research

Another strong point of the P.C.A. program is that sufficient funds have been set aside, through budgeting, in order to guarantee continuity of adequate research and development for leaner years which may lie ahead. Setting aside of reserves in good years is essential to the attainment of maximum benefits from any research program.

It has usually been that expenditures for research by most industries and by most companies

have been drastically reduced during poor business years and the result has been serious hindrance to any long-range program.

One trouble has been that management often has expected almost immediate answers in order to meet crises that have arisen and, through lack of understanding, has been willing to sacrifice long-range objectives, which are a characteristic of research. Short-sightedness has blinded industry to the attainable results of long-time studies which can assure the preservation of an industry or business, if not expanded markets.

Personnel the Key

Scientific and technical personnel of required vision are scarce but also indispensable to the interpretation of laboratory data in order for a research program to be successful. Such personnel constitute the biggest item of annual expense and, in the past, have been reduced to parallel downward trends in business. That isn't sound because the kind of fundamental research that will pay out is time consuming. It may take years to reap results but will prove profitable, as the cement industry believes, through the accumulation of information that creates business and protects existing markets. A qualified and experienced staff of experts is priceless to the conduct of research and, once assembled and trained, should be held together.

A third highlight of the P.C.A. organization for research is the creation of a separate library and literature research group under the supervision of an experienced research expert. Such a set-up in any industry is to be desired because true research into the voluminous literature on specific perplexing problems as interpreted by qualified personnel can be invaluable to the conduct of laboratory research on that particular problem. Much disconnected published material is usually available on a problem and there is a need for gleaning out valuable points from these sources in order to guide active laboratory work.

All industry needs research and much of the fundamental variety in order ultimately to enlarge markets and to preserve profits. The P.C.A. program is an excellent example to follow in planning future research which, it seems, generally will be patterned more and more to consider quality and the customer's viewpoint.

Bror Nordberg



snap judgment

You-r-r Out! And, "Umpires never make wrong decisions!" But, snap judgment can be very costly when it comes to purchasing containers for your products. You'll want to know about the consistent quality of the materials, the strength and protective features, the sharp, clear printing for your brand-name.

You'll also want to know your supplier and the services he renders. All are important to you because they vitally influence the sale and acceptance of your product. Your technically trained Chase Salesman is eager to give you this information. See him today.



- cotton bags of all kinds
- Topmill burlap bags

bags for all industry and agriculture...

- paper & Multiwall bags
- Saxolin open mesh bags
- combination bags, liners, and specialties.



CHASE BAG CO.

GENERAL SALES OFFICES
309 WEST JACKSON BLVD., CHICAGO 6, ILL.

BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MEMPHIS • BUFFALO • ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE
PITTSBURGH • KANSAS CITY • LOS ANGELES • MINNEAPOLIS • GOSHEN, IND. • PHILADELPHIA • NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY
OKLAHOMA CITY • PORTLAND, ORE. • REIDSVILLE, N.C. • HARLINGEN, TEXAS • CHAGRIN FALLS, O. • HUTCHINSON, KAN. • CROSSETT, ARK. • SAN FRANCISCO

Rocky's NOTES

Nathan C. Rockwood

Accounting for Varieties of Igneous Rocks

PROBABLY MOST of our readers are now more or less familiar with the term "petrology," since it is becoming more frequently used in the literature of the rock products industries. Petrology is a division of geology and involves the use of a petrological or polarizing microscope to measure the shape and size of crystals, of which minerals are composed, and hence identify them. It was first applied, so far as our industries are concerned, to a study of portland cement clinker, but now the two largest purchasers of mineral aggregates, the U. S. Corps of Engineers and the U. S. Bureau of Reclamation, are making use of petrology to determine whether or not aggregates are suitable to use in concrete structures.

It is largely by the application of petrology that researchers have been able to give us the constitution of portland cement. By knowing the percentages of the mineral oxides that go into the product, examination of very small particles of clinker under the microscope gives a clue as to how these are combined, and thus we have the usual cement analyses as percentages of C.S., C.S., C.A. and C.A.F. In the case of aggregates, one examines under the microscope a few grains of sand, and arrives at a conclusion as to whether or not it contains 2 or more percent of opaline silica, or some other mineral considered to be detrimental. It would seem to the interested layman that such analyses necessarily take a good deal for granted.

Other Uses of Petrology

One of the pleasant results of our excursions into those sciences which we believe to have a bearing on the problems of the rock products industries has been the receipt of review copies of books on some of these sciences from publishers and authors. This brings to our attention work in allied subjects which probably neither we nor you would otherwise know about. One such recent book received is entitled "Introduction to Theoretical Igneous Petrology" by Ernest E. Wahlstrom, of the Department of Geology, University of Colorado. At

first glance a rock products researcher or producer might not consider this book of very much interest, but, with a background of study in trying to probe some of the unsolved mysteries of cement and concrete, we have found the book interesting and suggestive.

There is a paragraph in the introductory chapter which is also considerably consoling, because there are a few of our scientific readers who have challenged our own imaginative discussions of the origins of poor concrete. This paragraph from Prof. Wahlstrom's book reads in part as follows: "Petrology does not give any comfort to the unimaginative, phlegmatic individual, who feels insecure in the realm of rapidly changing hypothesis and theory. Many of the basic ideas of geology and petrology are being challenged. ***In the field of petrology, the broad classification of rocks as igneous, sedimentary, and metamorphic has been rejected as unsatisfactory by certain leading thinkers. ***At the moment, the origin of granitic rocks is a subject of far-flung controversy."

So, if as old a science as geology is undergoing radical changes through new acquisitions of knowledge, we see no reason why we should be scared out of suggesting new theories and hypotheses about the origin and composition of cement and concrete, which certainly comprise a much newer science. That the two are essentially merely different branches of the same science appears to be proven by many facts, and indeed the scientific study of portland cement was initiated by geologists and geophysicists. However, with increasing developments and more and more specialization in both fields, the two branches of geology have grown farther away from each other, since in cement and concrete text-books there are few references to recent literature of geology and geochemistry, and vice-versa, for in this text-book before us on the crystallography of igneous rocks, which is valuable for its bibliography, there are no references to the work done on portland cement clinker, which is certainly closely allied to the synthesis of silicate igneous rock.

Origin of Igneous Rocks

At a certain distance below the outer rock crust of the Earth there is assumed to be molten or liquid rock or magma. This is the primary source of all the rocks and minerals that form the Earth's crust. When the magma breaks through the crust and solidifies, it forms a great variety of igneous rocks. It is the purpose of theoretical petrology to account for the formation of these various kinds of rock. There are different theories and the book before us is described as "a synthesis of the existing theories."

One may ask, what has all this to do with ROCK PRODUCTS' readers? The answer is that the problem is obviously very similar to that of accounting for the formation of the mineral compounds in portland-cement clinker. A large part of the book is devoted to discussion of "heterogeneous equilibrium and the phase rule." Those words simply mean that from molten or partly molten rocks, various minerals crystallize or freeze out of the liquid or viscous mixture at different temperatures and/or pressures. A reading of this part of the book can not help but impress one familiar with the manufacture of cement how various must be the compositions of portland cements under different conditions both as to exact mineral constituents and the heating and cooling treatment of the clinker. For in Nature one starts with a magma certainly as uniform in composition as most cement raw mixes and ends with a great variety of igneous rocks.

Another subject interesting to cement and concrete specialists is a new theory discussed here that some granite may have been formed from other igneous rock in place, by diffusion of mineral elements or ions of elements, from outside contacts of the igneous rock intrusion. If elements like sodium, potassium and calcium can diffuse or migrate through igneous rock, thus changing the nature of the crystallization, these same elements and probably others can certainly migrate or diffuse through concrete. That, of course, would make granite a metamorphic rock instead of an igneous one, and explode our previous theories that all granite was merely magma which cooled slowly below the surface, as opposed to such igneous rocks as basalt and other kinds of so-called trap rock, which cooled rapidly by coming to the surface while still liquid or viscous.

The book contains an appendix, which the author recommends the uninitiated read first, because it contains an abstract of the physical-chemical concepts necessary to an understanding of geochemistry. However, regardless of whether the reader is versed in geochemistry or not, he will find much interesting reading that requires no special knowledge save an elementary understanding of geology.

*Published by John Wiley & Sons, Inc., New York City, 1950, price \$6.00.



Flared sides of the rugged Euclid body speed loading by large shovels and reduce spillage. Smooth body interior, high dumping angle and distance of chute from rear wheels assure fast, clean dumping into hoppers or over the edge of stock piles and waste banks. The frame is a backbone of unmatched strength, built to last for the life of the unit.

● When this mid-western plant was completely modernized, Euclids were chosen to haul overburden and stone. Two Rear-Dump Euclids of 15 ton capacity replaced a fleet of highway trucks and easily handle the output of a 4 yard shovel. On a round trip haul of 3,000 feet, these quarry type "Eucs" average 131 trips every eight hours with capacity loads.

Dependable continuous performance of the Euclids assures a steady flow of limestone to the primary crusher. The low maintenance and operating cost of the "Eucs", as proved by company records, has reduced the cost per ton of material hauled.

If you want equipment to haul big loads fast and at low cost, the recommendations of a hauling equipment specialist are available without obligation. Write or call your Euclid distributor for complete information.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio



EUCLIDS



Move the Earth

LABOR RELATIONS TRENDS

Pension Plan of Rock Products Producer

By NATHAN C. ROCKWOOD

CONSISTENT READERS of this journal, as well as personal acquaintances of Charles Warner, are aware that he always has been outstanding in progressive outlook on industrial and labor relations. Lime manufacturers whose memories go back to the Codes of Ethics days of the Hoover administration as well as the more recent NRA period know that Charles Warner was the lime industry's leader in both movements designed to lift all industry to a higher plane of public and labor relations. Therefore, many readers of *ROCK PRODUCTS* will have as we do a special interest in an employee pension plan which Mr. Warner's company is putting into effect on July 1, 1950.

The Warner Co., Philadelphia, Penn., of which Charles Warner is chairman of the board of directors (for many years president), is a producer and manufacturer of sand and gravel, ready-mixed concrete, and lime, as well as a dealer in other building materials. It has assets of about \$19,000,000 and its present annual sales volume is approximately equal to its assets; in other words it turns over its capital investment once a year, at least during the present prosperous times. The corporation's net profit (after income taxes) was a little less than 14 percent of its sales dollar volume (or total approximate capital investment) in 1949, and between 13 and 14 percent in 1948. The character of the corporation's business requires working capital equal to approximately 20 percent of its total assets. During the past two years the Warner Co. has spent or written off over 10 percent of its gross income each year for plant and equipment, and for depletion and depreciation. In 1949 the corporation paid only 30 percent of its net income as dividends; in 1948, about 26 percent. Its total current assets are something more than 25 percent of its total assets; about half of the current assets are in cash or U. S. Government securities.

We have given the foregoing statistics because they will help the reader to compare his own business with that of the Warner Co., regardless of relative sizes. Probably, the Warner Co. figures are more or less typical, since it used to be general understanding that an operator in these industries to be prosperous must turn over his capital investment about once a year. In recent years, in the portland cement industry, for example, this has not always been done; it often took two years or more; but the one year turnover would probably still be considered normal, even under present conditions. The Warner Co. has about

1230 employees, of whom 226 or about 17 percent have been with the company 25 years or more.

The Warner Co. pension plan is of such interest to all our readers that we publish it in full in what follows, but first let us give you a brief outline: *Participation:* Each employee whose wages and conditions of employment are affected by collective bargaining agreements is eligible only to the extent provided for in the collective bargaining agreement affecting him. [As of March 16, 1950, unions at one sand and gravel operation and in the marine divisions of the company had rejected the plan.] Each salaried employee is automatically a participant. To qualify for a pension the participant must be 65 or older on July 1, 1950, and have completed at least 10 years of continuous service with the company. His pension will be, on an annual basis, 1 percent of his average annual earnings from the period January 1, 1940, multiplied by his years of service from then. From this amount will be deducted one-half of the primary insurance benefit under the national social security act. Primary benefit means only the pension of the employee and does not include any pension which his wife or other dependent may be entitled to. The minimum pension for 25 years of continuous service (including social security) is \$720 per annum, or \$900 if the social security pensions are increased.

Cost and Management: The plan is to be paid out of company funds exclusively, and will be under the management of a committee of five appointed by the board of directors. The cost of putting the plan into operation, for the year beginning July 1, 1950, is estimated by actuaries to be \$198,000. The estimated accumulated liability on account of service rendered in past years is \$3,750,000, which the company proposes to take care of, for the present, by paying hypothetical interest on that amount at 2½ percent or \$84,000 per year. It is intended to make annual contributions out of company profits toward the accumulation of a trust fund as may be needed, which eventually will make it self-supporting. The Warner Co. already has a pension plan with 61 pensioners and will continue these on the rolls and add future pensioners who are excluded from the plan as outlined because of their union contracts.

Plan in Detail

SECTION I—Purpose of Plan.

1. The Retirement Plan as herein-after set forth is designed to provide retirement income for life for em-

ployees, including officers, of the Warner Company (hereinafter referred to as the "Company") who attain retirement age in the service of the Company.

SECTION II—Definitions

1. The terms used herein shall have the following meanings, unless a different meaning is clearly required by the context:

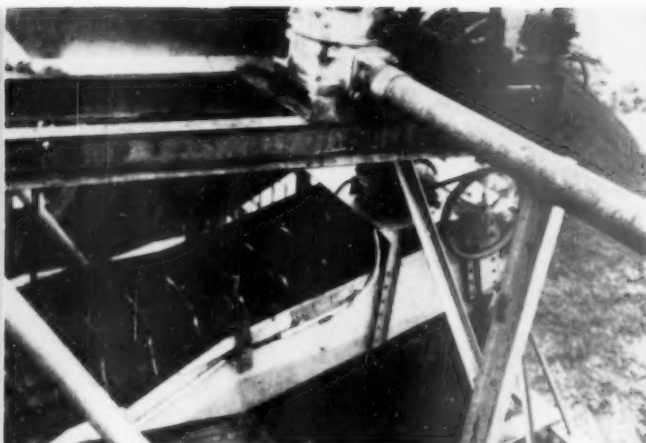
- (a) "Plan" shall mean this Retirement Plan effective July 1, 1950, as same may be amended from time to time thereafter.
- (b) "Board of Directors" shall mean Board of Directors of the company.
- (c) "Committee" shall mean the Retirement Plan Committee appointed by the Board of Directors to administer the Plan.
- (d) "Employee" shall mean each regular employee (including officers, but not Directors, as such) who receives compensation from the company other than in the form of a pension, retainer, or fee under contract, excluding employees (regularly) employed for less than 1200 hours per year and temporary employees who are not accumulating seniority with the company under its rules and practices.
- (e) "Participant" shall mean each employee of the Company who is eligible to participate in the Plan in accordance with the provisions of Section III hereof.
- (f) "Contingent Beneficiary" shall mean the person, if any, designated by a participant to receive benefits under one of the optional forms of retirement income payment provided for in the Plan.
- (g) "Continuous Service" shall mean service with the Company from an employee's most recent date of employment based on the Company's rules and practices for the determination of an employee's seniority with the Company. For purposes of this Plan no service with the Company after an employee's attainment of age 68 shall be considered, except in the case of employees who attain age 68 on or before July 1, 1950, to whom credit for continuous service with the Company prior to that date will be granted.
- (h) "Annual Earnings" shall mean a participant's total compensation paid by the Company during a 12-month period.
- (i) "Primary Insurance Bene-

(Continued on page 119)

PROFITS SOAR

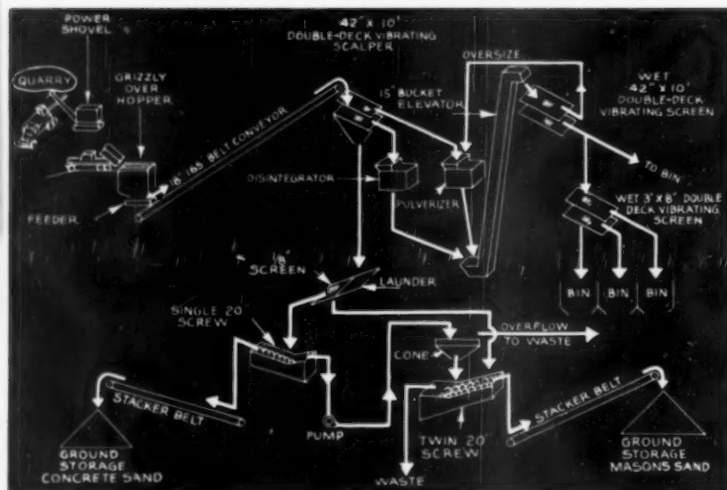
WITH TWO
Eagle Washers
ON THE JOB!

At
Airport Sand
and Gravel Co.
WEST WYOMING,
PENNA.



THE flow sheet below shows the plant layout of the Airport Sand & Gravel Co. Deposit averages 35 ft. in depth. Output is 100-tons per hour of concrete sand, mason sand and washed gravel, graded to $2\frac{1}{2}$ ", $1\frac{1}{4}$ " and $\frac{1}{4}$ ". Gravel is screened out and all sand is chuted to $\frac{1}{8}$ " wet screen. Material retained by screen flows to an Eagle 22' x 20" Single Screw Washer - Classifier - Dehydrator. Here clean, concrete sand is produced. Material flowing over the long weir is pumped to an Eagle 22' x 20" Double Screw Unit, shown above. Here mason sand is washed, classified, dehydrated and conveyed to stockpile. Material discharged over long weir end of tub — practically clear water — flows to waste.

Wherever materials are being produced for concrete highways and building purposes you'll find Eagles on the job, delivering materials to specifications and recovering marketable fines that are normally wasted. Eagle Fine Material Washers quickly return their cost. Ask for Catalog 47.



Sand and Gravel Equipment

"SWINTEK" DREDGE LADDERS - SCREW WASHERS - LOG WASHERS - DEHYDRATORS - SAND TANKS - CLASSIFIERS

EAGLE IRON WORKS

137 Holcomb Ave.

Des Moines, Iowa

Eagle "Swintek" Dredging Ladders

increase production. Chain screens the intake nozzle, as it digs, assuring maximum, uniform flow of solids. Lower cost per ton of material produced. Catalog 745.

the *Personal Side* of the news

Heads Research

H. F. GARVIN PELSUE, former president of the Metropolitan Sand and Gravel Corp., New York, N. Y., and a past president of the National Ready



H. F. Garvin Pelsue

Mixed Concrete Association, Washington, D. C., is now associated with Jaeger Machine Co., Columbus, Ohio, in charge of research. He also heads the company's advisory engineering service to ready-mixed concrete producers. Mr. Pelsue served for 20 years in production and sales with Graham Brothers, Inc., Los Angeles, Calif., including seven years as executive vice-president. He moved to New York in 1942 to assume management of the Metropolitan Sand and Gravel Corp., and direct its expansion into the ready-mixed concrete business. He became president in 1944 and served until 1949.

Division Committee Members

MORGAN R. BUTLER, chairman of the Manufacturers Division of the National Sand and Gravel Association, Washington, D. C., has appointed the following committees for the coming year: New Orleans Convention Committee—A. G. Conover, Hewitt-Robins, Inc., Passaic, N. J., chairman; Wayne King, W. S. Tyler Co., Cleveland, Ohio; and Morgan R. Butler, Butler Bin Co., Waukesha, Wis. Committee on Nomination—Wayne King, W. S. Tyler Co., Cleveland, Ohio, chairman; R. P. McKenrick, Blaw-Knox Div., Pittsburgh, Penn.; R. D. Ketner, General Electric Co., Schenectady, N. Y.; W. A. Rundquist, Pioneer Engineering Works, Minneapolis, Minn.; and E. D. Stearns, Barber-Greene Co., Aurora, Ill. Committee on Resolutions—R. C.

Johnson, Simplicity Engineering Co., Durand, Mich., chairman; D. E. Guilfoyle, Sauerman Bros. Inc., Chicago, Ill.; L. C. Mosley, Marion Power Shovel Co., Marion, Ohio; D. McM. Blackburn, Hendrick Manufacturing Co., Carbondale, Penn.; and J. C. McLanahan, McLanahan and Stone Co., Hollidaysburg, Penn. Exhibit Committee—E. J. Goes, Kochring Co., Milwaukee, Wis., chairman; E. M. Heuston, Bucyrus-Erie Co., South Milwaukee, Wis.; B. F. Devine, Chain Belt Co., Milwaukee, Wis.; C. O. Friend, Nordberg Manufacturing Co., Milwaukee, Wis.; A. Goldberg, Allis-Chalmers Manufacturing Co., Milwaukee, Wis.; and Gerald Smith, Smith Engineering Works, Milwaukee, Wis.

On Safety Panel

OTTO R. CORNELIUS, safety director at the Osborn, Ohio, plant of the Southwestern Portland Cement Co., Los Angeles, Calif.; Cy Baker, assistant superintendent of the National Lime and Stone Co., Findlay, Ohio; Carey Larry Kasi, supervisor, Columbia Chemical Limestone Mine Co.; and R. B. Beverly, safety director, American Aggregates Corp., Greenville, Ohio, appeared on the safety panel discussion on cement, sand, and gravel at the April 12 meeting of the Ohio Safety Council and Exhibit at Columbus, Ohio.

Plant Manager

ALLEN H. UHLER has been appointed plant manager of the Alsen, N. Y., plant of Lehigh Portland Cement Co., Allentown, Penn. He succeeds E. L. Snyder, who has retired after almost 48 years of service. Mr. Snyder started his career in the laboratory at the plant and has been in charge of the plant since 1925 when it was pur-



Allen H. Uhler

chased by Lehigh. The reconstruction and modernization program completed in 1940 was carried out under his supervision. He will continue to make his home in Saugerties. Mr. Uhler is a graduate of Muhlenberg College in Allentown, and also received a B. S. degree from New York University. He became associated with Lehigh in 1940, was trained at the Ormrod laboratory and later went to the Alsen plant. He became chemist in 1947 and served as acting plant manager in the absence of Mr. Snyder. During World War II, Mr. Uhler served four years in the Army Air Corps. Because of his scientific training, he was assigned to the meteorological service in which he became a first lieutenant. He served both in the North Atlantic and in Alaska.

Academy of Science Speaker

BRYANT MATHER of the Concrete Research Division, Waterways Experiment Station, Corps of Engineers, U. S. Army, Jackson, Miss., addressed the Earth Science Section of the Mississippi Academy of Science on the subject of chert at its annual meeting held recently at Mississippi State College, Starkville, Miss. Mr. Mather pointed out in his talk that both from the standpoint of the geologists and the concrete research engineer there were many important unsolved problems concerning the composition, origin and use of chert. He stated that an intensive investigation is being made of the nature of the material in various chert gravels in an effort to explain why some concrete made with chert aggregate gave unsatisfactory service while other concrete made with apparently similar chert has given excellent service.



E. L. Snyder

Reybold Succeeds Upham

LT. GEN. EUGENE REYBOLD has been appointed executive vice-president of the American Road Builders' Association, Washington, D. C., to succeed



Lt. Gen. Eugene Reybold

Charles M. Upham who recently retired after 24 years as engineer-director of A.R.B.A. A veteran of both World Wars, and wartime chief of engineers, U. S. Army, Gen. Reybold has an army career dating back to 1908, when he was commissioned a lieutenant in the Coast Artillery. After serving as a colonel in World War I, he transferred from the Coast Artillery to the Corps of Engineers with the permanent rank of major. His career as a builder in the Corps of Engineers brought him assignments as district engineer at Buffalo, N. Y., in charge of river and harbor work on Lakes Erie and Ontario and the Niagara and St. Lawrence Rivers; as district engineer at Wilmington, N. C., and Memphis, Tenn., and as Southwestern division engineer at Little Rock, Ark. Other tours of duty took him to Virginia, Washington, D. C., and the Philippines.

A graduate of the University of Delaware, Gen. Reybold, a civil engineer, is a member of the American Society of Civil Engineers and of the Society of American Military Engineers. He was awarded the Distinguished Service Medal in World War I, and achieved similar recognition in the form of an Oak Leaf Cluster in World War II. He retired from the Army in 1946.

Association President

GEORGE A. MEHAUS, executive vice-president and general manager of Texcrete Co., Fort Worth and Dallas, Texas, has been elected president of the Texas Concrete Masonry Association. He succeeds John P. Sheehan, Atlas Lime Co., El Paso, who has been elected a director of the Association.

PHIL BARNARD, Houston Concrete Products Co., Houston, has been named vice-president and VERNON COLE, Texas Concrete Works, Inc., Waco, secretary-treasurer. Directors are Charles T. Crowe, president, Crowe-Guide Cement Co., Amarillo; Robert P. Brown, Texas Concrete Block Co., Lubbock; and Arthur J. Clark, Builders Supply, Inc., Pharr, Texas.

Named President

J. EASTMAN HATCH has been elected president of the Utah Sand and Gravel Products Corp., Salt Lake City, Utah, to succeed the late William E. Ryberg, who died February 8. Mr. Hatch has been a director of the company since it was organized in 1920. He is also president of the Utah Lime and Stone Company. All other executive officers were re-elected. They include Ezra C. Knowlton, executive vice-president and general manager; Vaughn F. Carter, assistant manager, and Madison O. Willmore, sales manager. Kenneth Curtis, who has been with the company since 1926, was appointed general superintendent. The Utah Sand and Gravel Products Corp. recently completed a concrete batching plant at North Salt Lake. It also operates a railroad ballast processing plant at Rockland, Nev., serving Nevada and Western Utah.

Ideal Promotions

F. W. CALVERT, has been appointed Northern Division sales manager of Ideal Cement Co., Denver, Colo., in addition to his duties as sales manager of the Colorado Division. A. C. CRAIG has been promoted to assistant sales manager, Colorado Division, for the Denver office; E. A. KNOWLES has been named assistant sales manager, Colorado Division, for Colorado; and R. C. POLLARD has been made assistant sales manager, Colorado Division, for New Mexico. GUY FRIDAY has been promoted from plant engineer to assistant superintendent of the Portland, Colo., plant, and GLENN HORLBECK has been appointed assistant superintendent of the Ada, Okla., plant.

Honorary Member

DR. JAMES R. WITHROW, professor emeritus in the school of chemistry and chemical engineering of Ohio State University, Columbus, Ohio, was honored April 27 in Cleveland by presentation of honorary membership in the American Institute of Chemists. The presentation took place at the first annual meeting of the Ohio Chapter of A.I.C. Dr. Withrow served for several years as chairman of Committee C-7 on Lime of the American Society for Testing Materials and is the author of several papers on the industrial uses of lime, and the instigator of much research work on lime.

Candidate for Senator

GRANT THORN, president and general manager of Thorn's Ready-Mixed Concrete Co., Springfield, Utah, has announced his candidacy for Utah State Senator on the Republican ticket. Mr. Thorn is also secretary-treasurer of the Thorn Construction Co. and vice-president and general manager of the Superior Asphalt Paving Co. He is a former vice-president of the United States Junior Chamber of Commerce, and has served as president of the Springville Junior Chamber of Commerce and as vice-president and president of the Utah State Jaycees. He was elected vice-president of the Associated General Contractors of America, Intermountain Branch, in 1946, and the following year was elected president.

Mine Superintendents

J. W. BAIRD has been appointed superintendent of the Annandale limestone mine, Boyers, Penn., of the Pittsburgh Limestone Corp., Pittsburgh, Penn., succeeding R. S. Mitchell, who has retired. W. F. DRUSCHEL has been named to succeed Mr. Baird as superintendent of the Buffalo Creek mine at Worthington, Penn.

Manager of Sales

DONALD H. GOTT has been appointed manager of dealer sales of the building products division of the Great Lakes Carbon Corp., New York, N. Y. He will be in charge of sales for Permalite plaster aggregates, concrete aggregates, acoustical aggregates and other building products in the entire United States. Mr. Gott was formerly sales manager of the door division of the Mengel Co. Previous to that he was with the U. S. Gypsum Co. for 13 years, as sales manager of a product division and as assistant product merchandising manager.



Donald H. Gott

Talks on Limestone

PAUL N. DOLL, manager of the Missouri Limestone Products Association, Jefferson City, Mo., recently gave a talk before the Carrollton, Mo., Chamber of Commerce, stressing the importance of calcium secured from limestone for the health of the nation. He said that calcium, provided for the public through the use of limestone on farm land and other land where food is grown, and stock is fed, is carried into the human body and makes it stronger. Without calcium, the bone structures of people would break down completely, he pointed out. The loss of the mineral content of the land is amazing, Mr. Doll said. In the Mississippi Basin alone last year 68,000,000 tons of the mineral in soils was lost to the ocean, washing into streams, carried to rivers and then to the Gulf of Mexico. That loss must be replaced, he pointed out, and he showed how the government's program of assisting farmers in liming their fields can be made to pay for itself.

Assistant Sales Manager

JAMES G. MOERDER has been appointed assistant sales manager of the Three Forks Division of Ideal Cement Co., Denver, Colo., with headquarters at Butte, Montana.

Optimist Club

FREDERIC PICKFORD, secretary of the Medusa Portland Cement Co., Cleveland, Ohio, has been elected a vice-president of the Optimist Club of Cleveland.

Elected Mayors

L. R. FALK, owner and general manager of L. R. Falk Limestone Co., St. Ansgar, Iowa, and director and past president of the Iowa Agricultural Limestone Association, Inc., Des Moines, Iowa, has been elected mayor of St. Ansgar. WILLIAM D. DILLON, partner and purchasing agent of Dillon, Sharpe & Co., Columbus Junction, Iowa, and also a director of the Iowa Agricultural Limestone Association, has been elected mayor of Columbus Junction.

Elected Director

RAYMOND R. BROWN has been elected a director of the Oregon Portland Cement Co., Portland, Ore., succeeding the late Max D. Tucker. Mr. Brown is president of the Standard Insurance Company.

Visitors from Italy

PAOLO RADICI, general technical manager of Italcementi, Bergamo, Italy, together with Antonio Benigno and Enrico Briolini, technical advisers, recently visited the Alpena, Mich., operations of the Wyandotte Chem-

icals Corp. and the Huron Portland Cement Co. for the purpose of inspecting U. S. methods and equipment. Italcementi operates 32 plants in Italy and plans to purchase U. S. equipment under provisions of E.C.A. and the Marshall Plan in order to modernize its plants. They were escorted on their tour by Robert E. Young, special sales and engineering representative of Harnischfeger Corp., and Filippo Theodoli, who served as interpreter.

Plant Superintendent

HENRY J. KREBS has been appointed superintendent of the Bay Bridge, Ohio, plant of the Medusa Portland Cement Co., Cleveland, Ohio. He was formerly assistant superintendent of the Silica, Ohio, plant, which position will be taken over by Henry Restrick of the Cleveland office.

Heads Commission

JAMES L. HART, Hart Concrete Products Co., has been elected president of the Pan-American Commission of Tampa, Fla. He succeeds Ernest Berger. Mr. Hart has also been elected president of the Ybor City Chamber of Commerce, succeeding Joseph A. Bua.

Returns as Director

JOHN J. O'LAUGHLIN, former president and director of the Consumers Co., Chicago, Ill., has been re-appointed to the board of directors, succeeding the late Charles J. O'Laughlin. John O'Laughlin was president from 1945 to 1947 and a director from 1927 to 1948.

Elected President

C. W. PURDY of the Killbuck Sand and Gravel Co., Killbuck, Ohio, has been elected president of the Ohio Sand and Gravel Association, Columbus, Ohio. He succeeds Paul B. Conway, vice-president, Brewer and Brewer Sons, Inc., Chillicothe, Ohio.

Field Manager

CARL ELLING has resigned as agriculture agent for Marion County, Kan., to accept a position as field manager for Riddle Quarries, Inc., Marion, Kan. He has been county agent in Marion since 1946, and with Kansas State College since 1938.

Division Manager

C. RAY WILHELM, machine shop superintendent and head of machinery production and sales for the Universal Concrete Pipe Co., Columbus, Ohio, has been appointed southeastern division manager in charge of operations in Georgia, Tennessee, Alabama and Florida.

Vice-Presidents Elected

CHARLES E. SHEARER has been elected executive vice-president of the Keystone Portland Cement Co., Philadelphia, Penn. JOSEPH B. MCCracken has been named vice-president of sales, and PAUL F. MATHER has been made vice-president of production.

Joins Consulting Firm

DR. CHARLES WILL WRIGHT, Washington, D. C., has been elected a director of Behre Dolbear and Co., New York, N. Y., mineral consultants in mining, metallurgy, geology and management.

Association Director

R. W. CUNNINGHAM, general superintendent of the Canada Crushed Stone Ltd., Hamilton, Ont., Canada, has been elected a director of the Ceramics and Stone Accident Prevention Association.

General Manager

H. H. MORGAN has been appointed general manager of Robert W. Hunt Co., Chicago, Ill., in addition to his duties as vice-president and chief engineer.

OBITUARIES

EDWARD W. STEPHENS, manager of belting sales for The Goodyear Tire and Rubber Co., Akron, Ohio, died May 8 following a long illness. He was 51 years old.

F. WILLIAM STOLLE, owner of the Falling Springs quarry, near Stolle, Ill., died April 4 at the age of 77.

GENEROPO POPE, president of the Colonial Sand and Stone Co., Inc., New York, N. Y., died April 28. He was 59 years of age. Mr. Pope was also publisher of the Italian language newspaper, *Il Progresso*, and started the letters-to-Italy campaign in 1948 which was credited with playing a major role in defeating the Communists in Italy's 1948 elections. At his suggestion, many thousands of Italian-Americans wrote friends and relatives in Italy urging them to reject the communists.

GEORGE L. ANDERSON, who had been engaged in the sand and gravel business in Amite, La., for many years, died recently.

ROBERT RAY HAYS, SR., founder of the Hays Gravel Co., Wynne, Ark., died April 19. He was 77 years old.

ASSURE **DEPENDABLE** OPERATION AT **LOWER COST**



Use the **TEXACO** air compressor oil recommended for your operating conditions

No *ONE* oil can lubricate satisfactorily under all the conditions of air compressor operation. So Texaco has developed a *complete line* of air compressor oils. When used as recommended, you can be sure of dependable, top-efficiency operation and lower maintenance costs, regardless of the type of compressor or the operating conditions.

Your Texaco Lubrication Engineer, for example, will recommend Texaco straight mineral oils for normal conditions . . . Texaco inhibited oils for rust prevention . . . Texaco special heavy-duty oils where service is severe and carbon and gum formations are problems . . . and Texaco compounded oils if excess moisture is present.

Thus, use of the *right* Texaco air compressor oil

assures free rings . . . clean valves and clear air lines . . . reduced wear for all moving parts . . . lower costs all around.

For longer drill life, and more footage drilled at lower cost, use *Texaco Rock Drill Lubricants EP*. These are "extreme pressure" lubricants designed to give full protection against wear and to guard against rust under the severest conditions.

Let a Texaco Lubrication Engineer help you simplify and improve your maintenance lubrication procedures. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Lubricants and Fuels

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.



INDUSTRY *News*

Discontinues Perlite Business

ALEXANDER FILM CO., Colorado Springs, Colo., is going out of the perlite business and is offering the perlite assets of the AleXitE Engineering Division for sale. J. Don Alexander, president, states that although the company is the largest organization of its kind in the world, its business, especially in television, has been so great that all of the company's capacities have been overtaxed. According to Mr. Alexander, the principal owners and officers of the company have been advised by their doctors to take more rest instead of expanding in a business unrelated to the company's main operations. A suitable building on the trackage of two railroads in Florence, Colo., has been purchased and machinery ordered to process furnace-ready ore at the rate of about 50 t.p.h. In addition, a new modern type expander will be used for turning out PerAleX aggregate.

International Minerals Enters Phosphate Field

INTERNATIONAL MINERALS & CHEMICAL CORP., Chicago, Ill., has announced plans for a \$4,000,000 plant development in the phosphate fields of Polk County, Fla. This will mark the firm's entrance into the phosphate chemicals industry. Plans call for erection of a new office building as headquarters for the new operations; purchase of a 60-acre site near Bartow for location of the new office building; construction of a new plant for the manufacture of multiple superphosphate and phosphate chemicals, including dicalcium phosphate; construction of a sulfuric acid plant, construction of a machine shop, warehouse and service center to serve all of the firm's Florida operations, and erection of a new phosphate division analytical laboratory.

Fuller's Earth Processing Plant

AMERICAN CHARCOAL CO., Detroit, Mich., recently purchased the fuller's earth mines and plant of Sinclair Refining Co., Olmsted, Ill., and the fuller's earth deposit of Standard Oil Co. of Indiana, Olmsted, Ill. The American Charcoal Co.'s plants are to resume operations shortly. The combined capacity of the two properties with the present plant of the Ameri-

can Charcoal Co. at Ulin, Ill., will provide the largest fuller's earth processing plant in the world, according to the company. C. B. Richardson will be in charge of both construction and operation, which includes sizing equipment to the smallest micron size.

Ideal Cement Improves Trident Plant

IDEAL CEMENT CO., Denver, Colo., will spend \$3,500,000 to raise the capacity of its Trident, Mont., cement plant to 2,200,000 bbl. a year, more than double the present rate. The first stage of the improvement program is scheduled to be completed by Sept. 1, other stages reaching completion in 1951, 1952 and 1953. According to the company, the total projected capacity of 2,200,000 bbl. a year is at least 33 1/3 percent greater than the demand that can now be foreseen in the region for the next ten years.

The first unit operation calls for construction of a mill building and purchase and installation of modern finish grinding equipment. In addition, a new power substation will be constructed. Later, new crushing and raw grinding equipment, new kilns, finished cement storage facilities, laboratory and other service buildings will be built. Ideal currently has contracts to furnish cement to the Bureau of Reclamation for its Canyon Ferry and Hungry Horse projects.

Gravel Pit Not Nuisance

QUINN-ROBBINS CO. INC., Pocatello, Idaho, had an abandoned gravel pit ruled "not an attractive nuisance" by the Idaho Supreme court, recently. Suit had been filed against the company by the father of a small boy who drowned in the pit. The court ruled: "A pond or pool is not an 'attractive nuisance' such as to render the owner liable for the drowning of a child, where the dangers inherent in it are open and apparent, and there is no hidden, concealed or unusual danger or trap."

Sand Processing Plant

GEM SILICA, Emmett, Idaho, has opened a new plant which will process "Freezeout sand" for sand-blast sand, foundry molding, chicken grits and plastering sand. Ted and Del Dewey, owners, expect to attain a capacity of 75 t.p.d.

Modernization Program

PERLITE MANUFACTURING CO., Carnegie, Penn., is undertaking a \$100,000 modernization program. The program includes the installation of conveyor systems, bins and an additional furnace, according to T. C. Ward, president. The new furnace will enable the plant to process two tons of raw perlite per hour. The expansion, expected to be completed soon, will triple production.



Brooks Paving Co., Miami, Fla., loads lime rock from its pit using a 6 x 6 Lorain TL Motor Drag. The rubber-tired unit also is used to load sand, pour concrete and erect steel at this operation.

Report on Possible Alaskan Cement Plant

MAJ. S. E. HUTTON, consulting engineer, Seattle, Wash., whom old-time readers of ROCK PRODUCTS will remember as the engineer for the Pacific Coast Co.'s cement plant at Seattle, later known as the Diamond Brand plant of Superior Portland Cement Inc., has recently been engaged in making a survey on the possibilities of a portland cement plant near Windy Station in Central Alaska, for the Alaska Investigations Office, Bureau of Reclamation, Juneau.

Cement is expensive in central Alaska because of the shipping costs to the two principal consuming points, Anchorage and Fairbanks. The present sources of cement are the Puget Sound plants in Washington State, and the port of entry is Seward, the terminus of the Alaska R. R. Windy Station is about the only place on the Alaska R. R. where the necessary raw materials are available and these are none too good. The chief use for cement in Alaska has been for military installations, yet consumption has never exceeded 100,000 bbl. annually.

Maj. Hutton has reported adversely on such a projected plant because of the lack of present or prospective markets for even a 1200 bbl. per day plant, the very high labor cost, the very high initial cost, high fuel and power costs and the short operating season. He estimates it would cost from \$3.29 to \$11.43 per bbl. f.o.b., mill, to manufacture cement at Windy Station, allowing only 4 percent return on an initial cost of the plant and village to house the workmen of between \$8,000,000 and \$10,000,000.

Present cost of cement from Seattle by ship to Seward, and over the Alaska R. R. is \$8.53 per bbl. at Anchorage and \$10.39 at Fairbanks. Maj. Hutton estimates these costs can be reduced by barge shipments in bulk from Seattle to Anchorage to \$5.15 and to Fairbanks by rail from Anchorage to \$8.08, or at a joint water and rail rate to \$7.91 per bbl. He concludes that facilities for storing, sacking and bulk car-loading at Seward or Anchorage, serving all cement manufacturers and users, would be more useful, more economical, and more efficient.

Effect of Heavy Loads on Pavement

THE HIGHWAY RESEARCH BOARD, Washington, D. C., has announced plans for a large-scale test on concrete pavement under concentrated truck traffic using single axle loading of 18,000 and 22,400 lb. per axle and corresponding tandem axle loadings of 32,000 and 44,800 lb. The relative effects of different axle loads will be tested on parallel lanes of the concrete test road with trucks operating at an average frequency of one truck

per minute on a 24-hr. per day, 7-day per week schedule. The tests will be conducted on a 1.1-mile section of U. S. Route 301 in southern Maryland. This road consists of two 12-ft. lanes of mesh reinforced concrete pavement laid on a good granular subgrade. Each lane is 9-7-9 in. in cross section. The road was paved in 1941 and has withstood normal traffic and weather with very little damage. In addition to detailed observations of visible effects of the test on the pavement, measurements of surface elevations, stresses and deflections under the wheel loads, subgrade condition, and concrete quality will be made.

Portland Cement Production

PORTLAND CEMENT production was 14,238,000 bbl. during March, 1950, Bureau of Mines reports. Mill shipments totaled 14,613,000 bbl., an increase of 1 percent over the March, 1949, figure, while stocks of 23,204,000 bbl. on March 31 were 0.4 percent above the March, 1949, totals. Clinker production in March, 1950, amounted to 15,688,000 bbl., a decrease of 5 percent over the corresponding month of the previous year.

Development Corporation Formed

CEMENT AND GENERAL DEVELOPMENT CORP., New York, N. Y., according to a statement released by the company, has been formed to coordinate the development and financing of foreign and domestic industrial projects originated by its directors. According to the company statement, it will render advice and technical services to others who may be interested in industrial ventures.

Coming Conventions

June 26-30, 1950—

A.S.T.M., 53rd Annual Meeting and Exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J.

July 19-20, 1950—

National Agricultural Limestone Association, Midsummer Meeting, Netherlands-Plaza Hotel, Cincinnati, Ohio.

August 2-3, 1950—

National Slag Association, Board of Directors Meeting, Hotel Statler, Buffalo, N. Y.

Produces Crushed Stone, Agstone in Indiana

LUTGRING & SONS STONE CO., Branchville, Ind., is producing 1000 tons of commercial crushed stone and agricultural limestone per day, with daily output split between the stone and limestone. Used in the crushing and screening processes are three Gruendler pulverizers, a Pioneer 24-x 36-in. jaw crusher, a Pioneer 20-x 30-in. roll crusher, two 50-ft. elevators, two 3-x 10-ft. Seco vibrating screens, a 100-ft. belt conveyor and a 10-ft. Pioneer self feeder. All of the equipment is powered by five Caterpillar diesel engines. A Caterpillar diesel D6 tractor, equipped with a Trackson Traxcavator is used for stockpiling agricultural limestone, and a D7 and D4, also equipped with Traxcavators, handle stone and strip overburden. Ed J. Lutgring is plant manager.

Handle Rock Phosphate

Several members of the Missouri Limestone Producers Association have installed storage and unloading facilities for handling rock phosphate. Others handle the product in bags or unload bulk phosphate direct from a rail car into a spreader truck. According to the "News Letter," L. W. Hayes is planning a mixing plant which is to be used for blending soil nutrients on "prescription basis." An agronomist has been employed to handle soil fertility problems.

Advise Private Leasing of County Quarry

JEFFERSON COUNTY'S QUARRY, Louisville, Ky., should be leased to a private operator, the county road engineer, James B. McTamany, recently told the Fiscal Court. Operation of the quarry, where 25 workers were employed, was suspended January 1. Prior to that the county had been losing money on the quarry.

Gravel Firm Sold

GREENVILLE SAND AND GRAVEL CO., Greenville, Miss., has been sold to W. E. McCourt and associates of Greenville, Miss., who have formed the Greenville Gravel Co., according to Lee McCourt, chairman of the board of the Fischer Lime and Cement Co., Memphis, Tenn., former owners of the Greenville Sand and Gravel Co.

Perlite Expansion Plant

CAROLINA PERLITE CO., Salisbury, N. C., has opened a plant for the manufacture of expanded perlite aggregate at Granite Quarry, N. C. Officers of the organization are H. B. Howard, president; H. P. Hardiman, vice-president; and C. B. Mickle, secretary-treasurer.

Study Effect of Blasting Caps on Gradation of Rock

UNIVERSITY OF MISSOURI School of Mines and Metallurgy, Columbia, Mo., will make a study of blasting caps used with explosives in mining operations, in cooperation with the explosives division of the Olin Industries, East Alton, Ill., Dean Curtis L. Wilson announced recently.

Dean Wilson explained that the work will be done primarily to determine whether there is any difference in the gradation and volume of broken rock resulting from any given blast by using different types of blasting caps. The types to be used are instantaneous electric caps, delay electric caps, and short interval delay caps, or split second delay caps.

Western Cartridge Co. will furnish and deliver all the blast caps essential to complete the study, which will be made at the school's experimental mine under the direction of Dr. J. D. Forrester, chairman of the Department of Mining Engineering. F. S. Elfred, Jr., general manager of Olin Industries and a graduate of the School of Mines and Metallurgy, will represent the Western Cartridge Co. in the experimental work.

Subscribe to Underwriters Re-examination

THE VERMICULITE INSTITUTE has subscribed to Underwriters Laboratories' re-examination service for vermiculite plaster aggregate, E. R. Murphy, executive secretary of the institute announced. According to the institute, vermiculite is the only lightweight plaster aggregate now on the market that carries the U/L mark on every bag manufactured by members of its institute. The aggregate has secured official 4-hr. fire ratings for protecting steel columns and various types of floor and roof assemblies.

Jumbo Safety Posters

THE NATIONAL SAFETY COUNCIL is producing a series of jumbo posters devised to bring the message of safety not only to workers but to the general public as well. These weather-proofed posters come in eight sections for easy mounting and carry three-color illustrations with brief safety slogans. Twelve different 11 ft. 8 in. x 9 ft. 11 in. posters are produced each year. The National Safety Council recently moved its headquarters' offices to 425 North Michigan Ave., Chicago, Ill.

P.C.A. Safety Story

ONE of the most outstanding safety records of any heavy industry, and how it was achieved by the cement industry, is told from the worker's viewpoint in a recent pamphlet prepared by the Portland Cement Association and mailed to member firms.

Entitled "For Pete's Sake," the story, related by Pete in his contact with other workers and his family, unfolds the program which, in 25 years, has brought an 83 percent decrease in frequency of accidents. During a recent three year period in which portland cement production and shipments doubled, the frequency of disabling injuries was reduced 15 percent. Pete credits the association's relentless safety program for much of this success.

Near East Production of Cement and Phosphate

ACCORDING to the best available information, requirements of the Near East for cement cannot be met by present production of Egypt, Syria and Lebanon. Because of this situation a new plant is being contemplated, to be built near Alexandria, Egypt, and known as Alexandria Portland Cement Co.

Further development is projected for the port of Quesir on the Red Sea. This port now is used almost solely for the export of phosphate, with about 300,000 metric tons being shipped in 1947, most of which was destined for Spain. Development of the port is being considered in connection with the erection of a white cement plant, raw material for which is reported to be abundant in the region. In addition, a second white cement plant is being considered by a company now engaged in development of asbestos deposits in the area. The foregoing information has been abstracted from a report by Economic Counselor G. C. Howard, Cairo, Egypt.

Televise Story of Vermiculite

ZONOLITE Co., Chicago, Ill., has announced that more than 30 television stations throughout the country have scheduled showings of the company film, "The Wonder Mineral." The film, which runs for 18 minutes, tells the story of vermiculite from its discovery to present day uses.

Adds Equipment

HUNT LIMESTONE Co., Osceola, Mo., is adding new equipment including a new front end loader and an additional power unit for the crusher. Last year this quarry sold over 23,000 tons of limestone to the farmers of St. Clair county and greater tonnage is contemplated in 1950.

Perlite Institute Seal

AN OFFICIAL SEAL of the Perlite Institute has been approved and adopted by the member companies, it was announced by Wharton Clay, secretary. The seal will be used on bags of processed perlite produced by institute



Official seal of Perlite Institute

members, testifying that the contents meet the specifications of the institute.

Increase Truck Shipments of Cement

CEMENT from the Universal Atlas Cement Co. and Southwestern Portland Cement Co. plants at Osborn, Ohio, will be shipped to a greater extent by bulk cement truck instead of rail as soon as remodeling to facilitate shipping by truck is completed. Schwerman Trucking Co. of Ohio, which will deliver the cement for the plants, is spending approximately \$400,000 and has purchased 26 tractor-trailer units to haul the cement.

Firm Observes Anniversary

PETOSKEY PORTLAND CEMENT Co., Petoskey, Mich., recently marked its 29th anniversary with a party at which ten employees, who have been with the company 25 years, were honored and given awards by John L. A. Galster, president of the firm. Principal speaker was Dr. E. G. Beck of the Central Michigan College of Education. The film, "The Drama of Portland Cement," was shown.

Pavement Yardage

AWARDS of concrete pavement for the month of April and for the first four months of 1950 have been announced by the Portland Cement Association as follows:

	Square Yards Awarded
	During April, 1950
Roads	2,126,136
Streets & Alleys	2,481,341
Airports	424,784
Totals	5,032,261
	During First Four Months, 1950
	8,171,193
	7,122,151
	867,116
Totals	16,120,379

Buys Crushing Plant

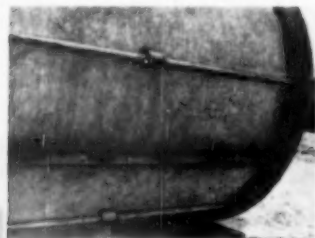
STERLING SAND AND GRAVEL Co., Fort Collins, Colo., has announced plans to purchase a crushing and screening plant owned by the city of Fort Collins. The machinery has not been used for several years.

HINTS *and* HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Pipe Form Tie Rod Retainer

SMALL U-SHAPED retainers welded onto the main drum of a concrete pipe form prevent vibration of the long

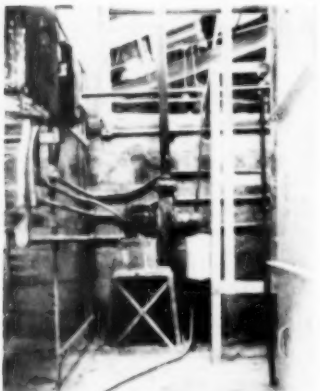


Tie rod retainers welded onto main drum to prevent vibration

tie rods which bolt the two ends of the form to the main cylindrical shell. A concrete pipe plant in the South which operates a Hume centrifugal pipe machine uses this method. In this system, the steel form is assembled, then spun in a horizontal position as the concrete is fed into the interior of the form. Centrifugal force compacts the concrete, giving it a very low water content which not only results in a dense, water-tight concrete pipe, but gives one with exceptional strength. The two ends of the form make up whatever type of pipe is desired.

Keeps Dust Out of Switchboard

A SIMPLE AND NOVEL method to keep dust out of the electrical control panel board used by the Bellefonte plant of Warner Co. on its No. 2 kiln in-



Dust control system for switchboard

strument panel is a small low pressure fan with an air filter on the suction side. This pipes air to the instrument panel. The delivery of air is such that there is always slightly more pressure inside the panel than the outside atmospheric pressure. This pressure arrangement automatically seals off, and prevents any dust from getting into the cabinet.

Suggested Explosives Magazine Design

STRICT ORDINANCES oftentimes require explosives magazines to be extremely well protected. It is a good idea not to let any precautions lie dormant even though no ordinance may apply specifically. In addition to providing earth barricades on all four sides of the magazine, a sprinkler system and lightning rods give added protection. To eliminate the danger of



Explosives magazine exhibiting many safety features

water freezing in the sprinkler system in cold weather, the pipes should be kept dry but under constant air pressure. A temperature rise, as occasioned by fire, melts the fusible link on the sprinkler head, releasing the air pressures and allowing the water to flow.

Lightning rods will be unreliable in summer if the ground rods are in ground which has dried out to a great depth. This would not only be unsafe, but violates most city ordinances which state that ground contact resistance shall not exceed 25 ohms. This can be remedied by running a cable from the contacts to a water main in a plowed furrow. If no main is available, there is the possibility of locating a ground rod in the permanently moist soil near a pond, river or lake.

The drawing suggests a type of building, exhibiting many safety features, that can be constructed at relatively low cost. It is of very light construction, minus windows but equipped with ventilators.

Crusher Installation

A SIMPLE primary crusher installation which meets needs adequately is found at a new crushed stone plant in



Primary crusher installation

the East. There, a 44- x 52-in. Birdsboro Buchanan jaw crusher, provided with corrugated jaws, is used. Material crushed is a sandstone. Trucks deliver the quarry rock to the crusher which is installed as shown in the illustration. To facilitate repairs a steel structure has been erected over the crusher with "I" beams for the chain blocks and crawl.

Kiln Door Counterweights

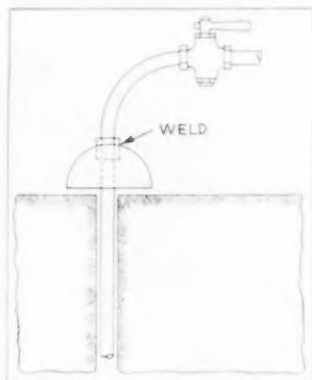
THE KILN DOORS of an Eastern concrete masonry producer, which open vertically, are counterweighted with lengths of 90-lb. railroad rails. Two lengths the width of the door are used, providing rapid and effortless opening into the kiln. The doors are of welded sheet steel construction with an air space between the two faces.



Arrow points to counterweight on kiln door

Reducing Danger When "Blowing" Drill Holes

TO REDUCE THE danger when "blowing" holes, the device shown in the diagram has been made. The funnel-like



Shield prevents accidents when "blowing" holes

shield is easily made in a shop. A section of pipe about 3 in. long is welded in the throat to serve as a sleeve into which a section of good rubber hose is press fitted. In practice the rubber section is a snug fit around the blow pipe shank, and it can be moved to suit the length of drill hole to be bottomed and blown free of sludge. While originally developed for the conventional horizontal drill hole, this device is equally useful on vertical shaft holes and those on surface operations.

Wear Resisting Truck Beds

THE TREND towards larger capacity dump trucks has brought with it greater problems of maintenance. The larger volumes of material loaded by excavating equipment have resulted in increasingly severe wear through impact and abrasion. Many operators have found that the use of austenitic manganese-nickel steel, in the form of flat bars and plates, provides an effective and economical method of combating this type of wear. This steel, containing 11 to 13 percent manganese, 2½ to 3½ percent nickel, not only work-hardens under impact to approximately 550 Brinell, but also has



Fig. 1, left: Alloy steel plates as originally installed in dump truck. Fig. 2, right: Same truck body after one year's use

the extremely high tensile strength of about 150,000 p.s.i. In addition, it can easily be fabricated or welded.

The truck-bed plates shown in Fig. 1 are ½-in. manganese-nickel steel which have been flame cut, formed to fit the bottom of the truck body, and welded in place with manganese-nickel steel coated electrodes. Fig. 2 shows the same plates after they had been in daily use at a midwestern limestone quarry for one year. In the same period of time, high carbon steel plates in another truck had been replaced four times.

Fig. 3 shows the process of welding manganese-nickel steel flat applicator bars in a dump truck. These bars were first tack-welded at the front end of the truck body with manganese-nickel steel coated electrodes, and then were bent to fit the rear of the body by means of an ordinary acetylene torch and lifting jacks working against a piece of angle-iron temporarily weld-



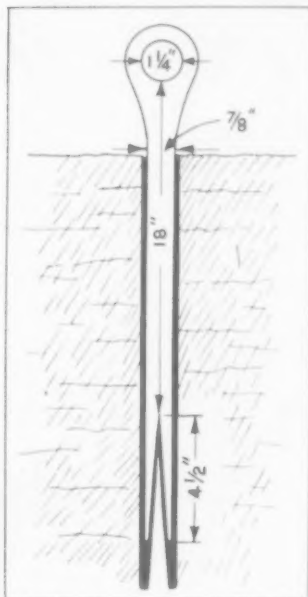
Fig. 3: Welding flat steel bars in truck body

ed across the top of the truck body. The downward pressure exerted by the jacks was sufficient to bend the bars into place after they had been heated to a dull red. The bars were then secured by heavy beads, 3 in. in length and spaced 3 in. apart. The flat applicator bars are 4 in. x ½ in. and are 16 to 20 ft. in length.

In general, manganese-nickel steel plates should be used in truck bottoms when fairly fine material is being handled; when large size stone is being handled, flat applicator bars are more suitable.

Multi-Purpose Eye Bolt for Attachments

MANY ACTIVITIES in the rock products industries call for a sturdy attachment from which to suspend snatch blocks, guy anchors, pipe lines or chain falls, to name a few. Many methods used are costly and time consuming, such as studdles held by wedging wood blocks against the side walls. The eye bolt illustrated here can be fabricated in quantity by a blacksmith at moderate cost, however. The dimensions indicated are for average requirements but may be varied to



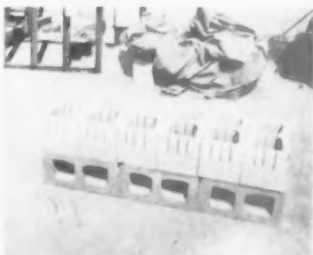
Eye bolt wedged into rock provides sturdy attachment for lines

meet specific needs. Ordinary cold rolled stock is used.

The eyes are secured by first drilling a hole in the ceiling or wall of the proper size to receive the shank of the bolt with wedge inserted. A few blows with a sledge hammer expands the split end, disintegrating the rock to form a pocket. Removal is accomplished by drilling a hole close to the eye and firing a ½ or ¾ stick of dynamite in it.

Reinforcing Block Against Earth Tremors

BLOCK PRODUCERS in the Southwest use masonry saws to a large extent to cut channels in partitions of block for the purpose of inserting steel reinforcing rods. Use of the reinforcement has been shown to be effective in resisting earth tremors. The illustration shows sawed block before the ends are knocked out.



Block sawed for knocking out slot to insert reinforcing rod

New Machinery

**ROCK
PRODUCTS**

Tractor Shovel

FRANK G. HOUGH Co., Libertyville, Ill., has added a new Model HE Pay-loader tractor shovel with $\frac{1}{2}$ -cu. yd. bucket capacity to its line, making

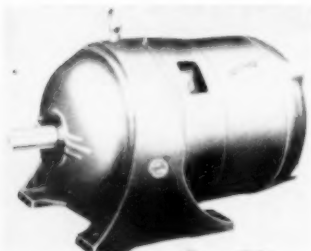


Tractor shovel with $\frac{1}{2}$ -cu. yd. bucket

five sizes of these shovels available with bucket capacities of 12 cu. ft. and $\frac{1}{8}$, $\frac{1}{4}$, 1, and $1\frac{1}{2}$ cu. yd. The Pay-loader will dig, load trucks, grade, level, backfill, spread, transport and remove snow, handle and rehandle bulk material both inside and outside, lift, lower, push, and haul. It has a full-reversing transmission with four forward and four faster reverse speeds coupled with forward reverse control separate from the regular gear shift. This system is said to assure speedy shifting. Ball bearing steering, hydraulic brakes, comfortable operator seating and operator location for full visibility of all operations also are featured. Full dumping clearance of 91 in. is provided to load trucks easily.

New Gearmotor Line

FOOTE BROS. GEAR AND MACHINE CORP., Chicago, Ill., and THE LOUIS ALLIS Co., Milwaukee, Wis., have announced a joint program for the manufacture of a complete line of gear-



Gearmotor with hard helical gears

motors. The new unit makes use of hard helical gears and other moving parts which have been processed and heat treated under new and improved methods of manufacturing control to achieve high load-carrying capacity, wear life, quietness of operation and compactness of design. The new gearmotor, manufactured in 17 sizes, provides single, double and triple reduction units having output speeds from 780 r.p.m. down to 7.5 r.p.m. Integral horsepower ratings from 1 through 75 are available. A wide selection, including open drip-proof, splash-proof, totally enclosed and explosion-proof construction motors are offered. A.c. and d.c. motors of all types and motors with special electrical characteristics are available.

Bottom-Dump Hauler

R. G. LeTOURNEAU INC., Peoria, Ill., has announced the model E-16 Tournahopper powered by the C Roadster Tournapull prime mover with a choice



Bottom-dump unit with three-engine choice

of three engines—GM-6-71, Cummins HRB-600 or the Buda 6-DC-844. The bottom-dump hauler has a heaped capacity of 16 tons. Its bottom-dump doors operate in a manner similar to a clamshell, swinging upward along the outside of the Tournahopper bowl as they open. Positive electric control of the self-cleaning doors permits controlled ejection by opening the doors to any desired width. The 90 deg. left and right turning angle gives the rig a minimum turning radius of 14 ft. This, plus multiple disc air brakes on all four wheels and positive electric power steer, the firm states, makes it safe and easily maneuverable.

Bucket-Elevator Chain

BEAUMONT BRICH Co., Philadelphia, Penn., is in production of a new bucket-elevator chain made from heat-treated alloy steel. According to the manufacturer, design features of the Beaucalloy chain include projecting guards which deflect material from chain joints; slotted boss ends which prevent pin from rotating and protect



Heat-treated, alloy-steel bucket elevator chain

cotter pin from wear; connecting pins formed from heat-treated alloy steel which have a centerless ground finish that reduces friction, a single link barrel cast integrally with side bars, and a special K-2 attachment which permits use either of dove-tail lock buckets or conventional type A buckets.

Electric Car Puller

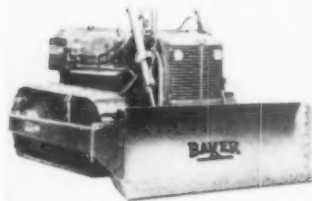
KING MANUFACTURING CORP., Chicago, Ill., has announced a new electric car puller, available in five sizes, from 2 to 10 hp. and from 1500 to 6250 lb. line pull. The puller can move loaded freight cars at level grades 40 to 48 ft. per min. Anti-friction bearings are used throughout. Spools are 5 in. dia. on the two horsepower unit, and 6 in. dia. on other models. This equipment permits outdoor use the year around and can be mounted vertically or horizontally, the firm states. All models have 220-440 volt, 3-phase, 60-cycle motors. Motors with other current characteristics are available.



Car puller mounted vertically

Hydraulic-Controlled Dozers

BAKER MANUFACTURING CO., Springfield, Ill., recently placed in production a complete new line of hy-



Dozer with low over-all height

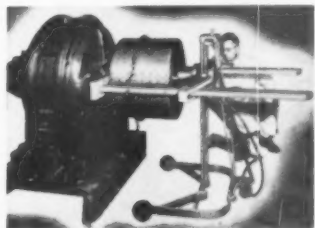
draulically controlled bulldozers and grade builders designed for application to the Allis-Chalmers HD-5 standard and wide-gauge tractors. Blades are controlled by twin hydraulic cylinders mounted at the front of the engine frame, with overhead height of the mounting being less than for the tractor. Features claimed for the new units are direct lift with a minimum of working and wearing parts, positive down pressure, finger-tip control, ability to service tractor engine without removing dozer mounting, and reliable, fully-protected front-mounted pump.

Portable Hydraulic Pulley Puller

INDUSTRIAL ENGINEERING EQUIPMENT CO., Davenport, Iowa, has introduced a new heavy-duty portable hydraulic pulley puller rated at 50 tons pressure. This latest model has been designed to remove large pulleys, wheels, gears, etc., from shafts, handling jobs beyond the capabilities of the smaller units.

Two feet at the ends of adjustable arms are placed behind the object to be removed and a ram is placed in position against the end of the shaft. Pressure applied by the ram against the shaft by means of a hydraulic jack quickly loosens and removes the object without damage, the producer states.

The 50-ton model has a special heat treated alloy steel cross beam, puller

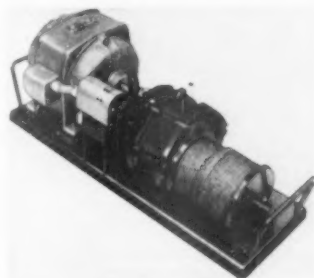


Heavy-duty portable hydraulic pulley puller

arms and feet. Pressure exerted by the ram is regulated by a 3-speed hydraulic pump. Though weighing more than 600 lb. the puller is said to be moved easily and can be operated by one man, handling pulleys as large as 42 in. in diameter with face width up to 48 in.

Power Winch

ST. ANTHONY MACHINE PRODUCTS CO., Minneapolis, Minn., recently announced a portable electric winch designed to provide mobile lifting and pulling power. The Stampeo Tugger, available in six models, is powered to furnish a line pull of from 500 lb. to 1500 lb. at speeds from 55 to 220 f.p.m. Double reduction spur gears, specially fabricated from high tensile steel, convert the output of a high torque, repulsion induction motor to a constant speed and power ratio on the drum of the winch. The reducer is coupled to the motor direct and is totally enclosed to permit higher gear efficiency and quiet operation while running in a continuous oil bath. A lever handle

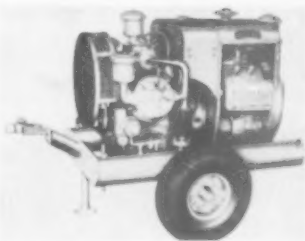


Portable electric winch

controls both the mechanical brake and the reversing switch on the motor. The company considers the Stampeo Tugger ideally suited for operating drag lines; powering foundry cupola chargers; auxiliary winch for returning car puller cable; providing power for cranes, hoists and derricks on shipping and receiving docks; operating conveyors; and truck winch for loading and unloading heavy, bulky materials. The Tugger, with either single or three phase dual voltage motors, can be set up ready to operate immediately wherever an electrical outlet is available.

Lightweight Compressor

DAVEY COMPRESSOR CO., Kent, Ohio, has announced a 60 c.f.m. compressor reputed to be lighter in weight, more economical in operation and lower in cost than conventional machines. Known as the Davey Super Chief, Model 60-WBD, the new unit is of the 3-cylinder air-cooled type. It employs stainless steel disc "permanent peak efficiency" valves which it is said



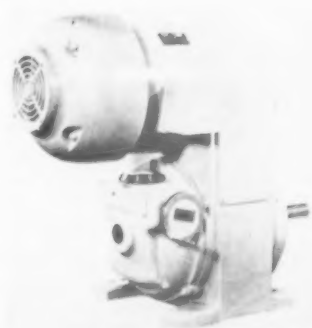
Lightweight, air-cooled compressor

will not carbon. The compressor features an automatic centrifugal clutch which engages at 700 r.p.m., disengages the compressor when the engine is cranked, and facilitates easy starting. The Super Chief is powered by a Model VP-4, 4-cylinder air-cooled Wisconsin engine.

The unit has full force feed lubrication throughout by means of gear-driven pumps on both engines and compressor; replaceable-element type air and oil filters are employed; and a built-in unloader system automatically maintains any predetermined air pressure up to 100 lb. The manufacturer also states that the unit will operate efficiently in a temperature range of -65 deg. F. to +135 deg. F., and is light enough to be pulled about by hand.

Enclosed Variable Speed Motor

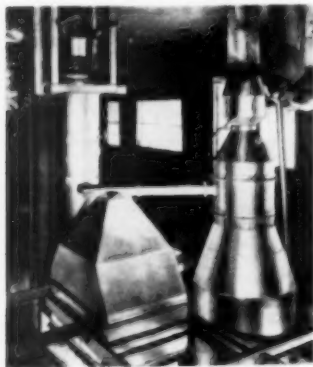
STERLING ELECTRIC MOTORS, INC., Los Angeles, Calif. has announced that the variable speed motor, termed the Sterling "Speed-Trol" motor, now is available in the "Klosd-Tite Fan-Cooled" design. This completely enclosed fan-cooled variable speed unit has fingertip control of speed. A large, easy-to-read speed indicator is said to allow infinite speed adjustment through either fingertip control on the motor or mechanical, electrical, or lever-type controls. The unit is considered desirable in rock and gravel plants where drip-proof or open motors are unsuitable.



Completely enclosed variable speed motor

Unit Perlite Expanding Plant

JOHNSTON MANUFACTURING CO., Minneapolis, Minn., has placed a complete perlite expanding plant on the market. The plant, a compact vertical-



Complete unit perlite expanding plant

type unit, features a fully automatic operation from feed hopper to bag with full automatic controls. A built-in dust control system makes it possible to operate within the city limits and inside buildings, the manufacturer states. A Johnston low pressure 16-oz. burner using either light grade gas or oil is used in the 24- to 30-cu. ft. bag per hr. producing plant.

All parts of the plant are arranged so that one or several plants can be operated for limited or large production requirements. The separation hopper is designed for handling the maximum furnace production and arranged to separate and cool the processed perlite. The special cyclone has been developed for the handling of perlite aggregate and to further cooling and separating. A standard 4-cu. ft. (or smaller if desired) bagger is supplied with the plant. Plants are furnished with steel framework for supporting hood, cyclone, bagger and exhaust fan, or this supporting frame can be optional as all parts can be furnished to be mounted on the purchaser's own building frame if desired.

Elastoplastic Caps

S. S. WHITE DENTAL MANUFACTURING CO., New York, N. Y., has designed elastoplastic caps to fit over $\frac{1}{2}$ -in. Alemite dot fittings to prevent dirt and other matter from lodging on the tip. The black, flexible vinylite caps are easily applied and removed and are held by friction, the firm states.

Improves Earthmovers

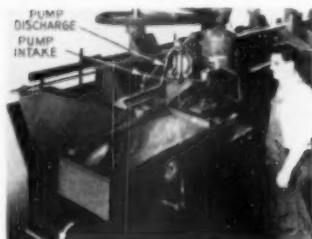
R. G. LETOURNEAU, INC., Peoria, Ill., has announced a new plan under which customers may have their choice of engine when ordering the

C Roadster Tournapull. This unit now is available with either a General Motors 6-71, Cummins HBI-600 or Buda 6-DC-844 engine.

The C Roadster Tournapull can be used as a prime-mover for a 16-ton Carryall scraper, or a Tournapuller bottom-dump hauling unit. The C Roadster is built for operation at a higher top speed and is equipped with a heavy-duty, five-speed transmission with a top road speed of over 30 miles per hour in fifth gear.

Visual Sampler For Control of Tailing Losses

DENVER EQUIPMENT CO., Denver, Colo., is producing a new Deco Visual Sampler which is said to provide instant, visual inspection of mineral concentrating efficiency. Changes in grind, flotation time, reagent application or cleaning and recleaning arrangements can be made and put into effect long before ordinary laboratory



Visual sampler for inspection of mineral concentrating efficiency

assay reports would indicate such changes necessary, according to the manufacturer. This unit consists of a $\frac{3}{4}$ -in. Denver suction-pressure pump and a pilot size Denver-Wilfley concentrating table mounted on a structural steel base. Both pump and table are V-belt driven by a $\frac{1}{2}$ -hp. electric motor. A mineralight lamp can be used to detect fluorescing minerals or to identify or trace reagents having fluorescent qualities.

The Visual Sampler can be mounted on flotation machines or other concentrating equipment at any desired point in the circuit. It is especially adapted for constant inspection of tailings coming from the last cell of a flotation machine where mineral values being lost in tailings can be detected immediately, the firm states. The pump draws pulp from the concentrating machine and pumps a metered flow to the feed box of the pilot table where visual inspection reveals gravity composition of pulp. Table concentrate and tails are returned to the concentrating machine. Sampling, according to the company, is constant, balanced and accurate. The unit comes in table deck sizes of 40 x 18 in. or 50 x 24 in.

Friction-Proof Oil

POWER BALL OIL CO., INC., Columbia, S. C., is making available an oil additive said to increase the lubricating qualities and performance life of any oil or grease to which it is added. Additional features claimed for this additive are rust-proofing, detergent, and penetrating properties, as well as large savings in power costs through reduction of friction in driving or driven machinery. The new compound is said to be non-corrosive and non-acid forming, non-injurious to ferrous or non-ferrous metal, and equally adapted to a large diesel engine or the works of a watch.

Vibrating Test Sieve

SYNTHON CO., Homer City, Penn., is now in production on a new vibrating test sieve shaker for laboratory screen analysis work that is easily portable and that operates on 110 volt a.c. current. Vibration is imparted to the stack of seven standard 8-in. sieves by a patented electromagnetic drive energized by rectified, half-wave a.c. current. Sixty-cycle current produces 3600 vibrations per min. Special units can be supplied for other types of current.

Amplitude of vibration is regulated by a rheostat located on the base of the cabinet and a reset timer provides accurately timed test periods. The unit is mounted on three adjustable feet that permit quick leveling.



Portable, electromagnetic test sieve unit

Adds 4-Ton Truck to Line

DODGE DIVISION, CHRYSLER CORP., Detroit, Mich., is in production of a new model in the 4-ton class which has been added to its line of basic



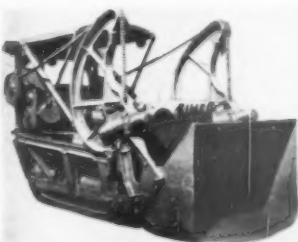
First model in new line of 4-ton trucks

truck models. The company now produces 30 separate truck models in this heavier line, bringing to 396 the total number of models offered. Designated as Y and YA models, the new trucks have a nominal rating of 4 tons, a gross combination weight of 50,000 lb. and a gross vehicle weight of 28,000 lb. A new engine developed for the new truck line develops 330 lb.-ft. gross torque, and the six-cylinder engine delivers 154 gross hp., has a compression ratio of 6.5:1 and a displacement of 377 cu. in.

Crawler Shovel Loader

EMICO CORP., Salt Lake City, Utah, has announced the RockerShovel 104. In a recent demonstration this unit was said to load wet sand and gravel at the rate of 8 cu. yd. per min., and fill a 6-ton Dumptor in about 40 seconds. The RockerShovel can be used for loading or bulldozing. Eliminating the necessity of turning around to dump because of its straight backward and forward motion, the unit, in field tests has proved to be about twice as fast as much larger conventional excavators, according to the company.

The RockerShovel has a 48-hp. diesel engine, and rolls its 2-cu. yd. gravel bucket overhead. Designed to dig and load blocky rock and abrasive ores in underground or surface operation, the RockerShovel is constructed of abrasion-resistant alloy-steel ma-



Crawler-mounted shovel loader

terial throughout. For heavy duty rock loading, the 104 is equipped with a 1 1/4-cu. yd. bucket and is powered by either diesel engine or electric motor.

Power Control Units

KAY-BRUNNER STEEL PRODUCTS, INC., Los Angeles, Calif., is offering a new line of power control units designed for crawler tractors and for cable control use, according to the company.

The line includes three models: Model C-90D, double drum, for tractors of 50 hp. and up; Model C-50D, double drum, for tractors up to 50 hp.; and a Model C-50S, single drum, for tractors up to 50 hp. A special unit, known as the Model C-90DL, for extra heavy duty work, features extra heavy duty clutch and cone, and special drum and control guards for added protection.

Features include alloy, heat-treated cast steel cases and covers; heat-treated, alloy steel gears; roller or ball

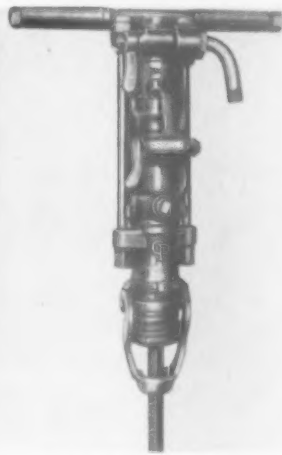


Power control model C-50D

bearings on all turning parts; high-strength, alloy cast iron clutch and brake drums; cone-type clutch; gear ratios from 5 to 1, up to 12 to 1; swinging fairleads on Models C-90D and C-50D, and adjustable control levers.

Sinker Drill

CHICAGO PNEUMATIC TOOL CO., New York, N. Y., is offering the CP-59 drill recommended for holes up to 25 ft. in the 55-lb. class. It features high drilling speed, rotation power and hole-cleaning ability. With the new 4-in-1 backhead, the CP-59 can make changeovers quickly to either plain dry, blower dry, wet or air-water operation by simply removing plug and changing water or air valve assemblies. This eliminates the necessity of buying individual backheads for each



Sinker drill in 55-lb. class

operation. A newly-designed valve, efficient lubrication system, replaceable bronze chuck nut and cylinder bushing liner are other features.

Voltage-Type Accelerating Relay

GENERAL ELECTRIC CO., Schenectady, N. Y., Control Divisions, has announced an improved voltage-type accelerating relay, designed specifically for starting single-phase, capacitor-start and capacitor-start capacitor-run motors. According to company engineers, the new relay is particularly applicable where adverse atmospheric conditions exist or where it is desired to have remote control which can be incorporated into an explosion-proof case. Designated as CR1057-J, the relay can be furnished with or without cover, wired from top or bottom. The manufacturer states that all parts are corrosion resistant and that tests prove it easily withstands the most severe vibrations encountered in compressor application.

Trailer-Mounted Portable Compressor

GARDNER-DENVER CO., Quincy, Ill., has developed a new line of easily handled trailer-mounted portable compressors available in three sizes and balanced for one-man handling. The air-cooled compressor, with V-belt drive to gasoline engine is mounted on a sturdy pipe tank type base. The unit is equipped with semi-pneumatic rubber-tired roller bearing wheels, drawbar, trailer hitch and stabilizer let. The unit can be readily towed behind a car or service truck, according to the manufacturer. The unit's forged steel crankshaft is supported on both sides of the throw by adjustable Timken tapered roller bearings.

RESEARCH



PORTLAND CEMENT ASSOCIATION'S NEW RESEARCH LABORATORIES

The \$3,000,000 facilities just dedicated have complete and up-to-date equipment for research on cement and concrete, manned by enlarged staff of experts

DEDICATION OF THE Portland Cement Association's new research and development laboratories at Skokie, Ill., just outside Chicago, on June 8, 1950, marked the official opening of the largest and most completely equipped laboratories in the world which are devoted exclusively to research on portland cement and concrete.

The \$3,000,000 facilities provided for the use of the association's staff of scientists, which include renowned physicists, chemists, engineers, mathematicians, petrographers and experts in related fields, are an emphatic endorsement of the benefits attainable from research. Much has been accomplished during the 54 years that the association has been actively engaged in research. This expansion also reflects the association's recog-

By BROR NORDBERG

nition of the lack of knowledge of some of the factors in what makes good concrete perform satisfactorily while some concrete exhibits poor durability. It marks the opening run of a program to accelerate long-time researches already in progress and the undertaking of new approaches to the solution of problems which will yield better performance from concrete.

It was June, 1946, that the Portland Cement Association, through president Frank T. Sheets, announced its plans for enlarging its activities in research and development and set up the newly created Division of Research and Development in order to

improve administrative direction and to intensify effort toward the solution of research and development problems.

At that time plans were laid for the new laboratories and the By-Laws had been amended to set aside a definite and substantial fraction of yearly income in order to assure adequate financing and continuity of the expanded program which is now becoming reality with the new laboratory.

The laboratories, as illustrated herein, were designed to facilitate operations of an enlarged staff and provide the latest in scientific equipment and apparatus for the disposal of the various sections of the research and development departments. At present the staff at Skokie numbers 70 people, and there are in addition five

staff members at the association-sponsored fellowship at the Bureau of Standards in Washington, D. C.

Each of the separate research sections has its own laboratories within the buildings, convenient to the individual managers and self-contained with their own curing and freezing rooms, where they apply, for the convenience of operating personnel.

Organization

With location of the laboratories at Skokie, research and development are separated from the promotion and advertising division of the P.C.A., which is conducted from administrative headquarters which remain at 33 W. Grand Ave. in Chicago.

The program at Skokie is administered by Dr. A. Allan Bates, vice-president for research and development, and by H. F. Gonnerman, assistant to the vice-president for research and development. Hubert Woods is director of research and M. D. Catton, director of development.

There are five separate sections comprising the research department which include basic research, managed by T. C. Powers; applied research, managed by William Lerch; field research headed up by I. L. Tyler; manufacturing research under C. F. Clausen, and the Portland Cement Association Fellowship at the Bureau of Standards in Washington, D. C. under the directorship of Dr. R. H. Bogue.

Development is broken down, according to activity, into a structural development section managed by C. C. Carlson and the transportation development section which E. J. Felt manages.

While the scope of activities of all the foregoing sections is being enlarged and facilities provided for that enlargement in the new laboratories, it is of particular interest to us that there will be a greatly enlarged program for manufacturing research to aid member manufacturers of port-

land cement in solving production problems and in the improvement of operating practices which bear upon high quality of cement. It is also of interest that a separate Literature Research Section and Library Group has been established to function for both the research and development departments. This group is under the supervision of Dr. Harold H. Steinour, who has been engaged in research for many years with the Association. The various functions of the separate sections will be touched upon later in this article.

Laboratory Buildings

As would be expected, the buildings demonstrate the wide range of uses of portland cement and concrete, serving as an outstanding demonstration of the architectural beauty and utility of concrete construction.

The laboratory group consists of two architectural concrete buildings, with unpainted exteriors, joined by a covered walkway and providing some 98,000 sq. ft. of working floor space. They are three times the size of the former research facilities in Chicago which they replace. Location is on West Harrison St., 16 miles northwest of Chicago's loop with the buildings located on one corner of a 15-acre plot to permit conducting outside research and possible expansion in the years to come.

The main laboratory building, with 80,000 sq. ft. of floor space, is a two-story structure with a penthouse and basement and is designed (see plan layouts here) to house the offices and laboratories of the various research and development sections and their related temperature, humidity, chemical and physical testing rooms. The library, conference and reading rooms, a drafting room, clerical space and a cafeteria are also located in this building, together with service areas and maintenance rooms.

In the rear of the main building, an

auxiliary laboratory building of 18,000 sq. ft. floor area was built to provide storage space and to accommodate processing operations, including the crushing and screening of aggregates, the mixing of concrete and other operations of a nature which require noisy and sometimes dust-producing machinery and high temperatures. This building is provided with dust collecting equipment and with overhead cranes and other special services. It has no basement.

Design of Buildings

The main building is an E-shaped structure in plan, with wings to the rear which are connected. An enlargement of the central wing at the rear end was provided to accommodate a 500-ton compression machine with overhead crane for the handling of large specimens to be tested. The plan drawings show how this wing is connected to the other wings of the building so that two interior courts result, which are landscaped.

Overall dimensions of the rectangular auxiliary building measure 102 x 180 ft. With the exception of the central portion which houses the industrial processes laboratory and has a 32-ft. ceiling height, the building is one story.

Architectural Treatment

Decorative and structural qualities of concrete were given full play in the design of both buildings. Pleasing effects are created by reeded architectural concrete piers separating the large window openings. These piers are 8 in. thick in the main building and were cast in plaster waste molds. They were set back with respect to the 11-in. thick exterior walls and spandrel beams to produce sharp horizontal lines which are emphasized by natural shadows. Architectural versatility of concrete is effectively demonstrated in the main building



Technical men in the cement industry assembled for a meeting in the physical testing room prior to installation of equipment

RESEARCH

through the use of precast ornamental panels set into the soffits of overhanging roof canopies and into the side walls of several of the wings. Practically all exposed metal work is aluminum.

Exterior walls were given a pleasing texture and color by use of selected form boards with distinctive grain and by means of a grout clean-down. Texture is neither very smooth nor very rough. A white portland cement was used in the clean-down grout, applied with a stiff brush.

Interior walls have several finishes. Most of the walls in the basement of the main building and in the auxiliary building are exposed, cast-in-place concrete, and nearly all the interior partition walls in the main building are of concrete masonry. The principal lightweight aggregates available in the Chicago area, and pumice as well, were used in masonry units comprising various wall sections.

Some concrete masonry walls were left unpainted while others, including the office, lobby, auditorium and corridor walls, were finished in attractive colors. Standard 8- x 8- x 16-in. units were used. Their application is one of the best we have seen to demonstrate the effectiveness of properly laid and carefully jointed masonry walls.

A bituminous seal coat and aluminum asphalt base paint were applied on the walls in the laboratories where humidity must be controlled. Portland cement plaster was applied to the walls on the moist rooms and kitchen. Very effective use of cast stone was made in the lobby, front stairway and in the shower and toilet rooms.

Both buildings are wall-bearing and the engineering design is one-way and two-way slab-to-girder, with the use of wide, shallow girders in order to increase headroom and provide a good ceiling effect and free run to ventilating ducts.

Structural Features

The auxiliary building was designed for spread footings while the main building is supported on concrete piles. A total of 530 piles, averaging 35 ft. in length, were required, which includes 27 piles to support a 262-cu. yd. concrete base for the 500-ton compression testing machine. Foundation for this machine, incidentally, is independent of that for the first floor of the building in order to eliminate shock. A second tension and compression machine, of 200-ton capacity, is also supported on its separate base. Reinforcing was placed throughout in compliance with A.S.T.M. specifications and control joints were provided at least every 22 ft. in all walls. In interior walls of the main building, control joints were placed at the sides of columns which occurred about every 20 ft. in order to separate the columns from the walls, and block facing, applied in various thicknesses to load-bearing walls, was anchored to the columns. Ceiling anchorages consisting of 2½- x 1-in. 14 gauge steel angles were used to give lateral stability to concrete masonry walls.

Spandrel beams were placed integrally with the floor slabs and all interior columns are square or rectangular. It is of interest that very excellent workmanship was attained in casting certain circular columns in

heavy paper tubes without any support other than the strength of the tubing.

Trap rock course aggregate concrete topping was applied to the floor slabs of all working areas. Other surfacings include asphalt tile applied to the concrete slab in corridors and in the main executive offices, and terrazzo floors in the lobby and rest rooms. Radiant heating, through hot water coils, was built into the floor of the aggregate processing room to enable drying aggregates while in storage.

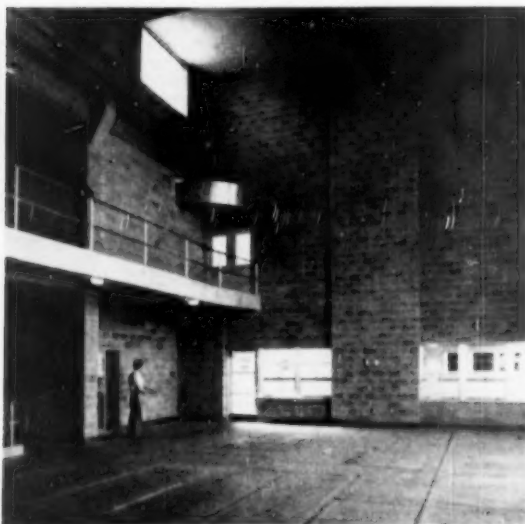
Construction was supervised by inspectors, with emphasis on careful control of the mixing and placing of the concrete. Materials selected were those materials available to the Chicago construction industries which had proved service records and which would produce light-colored concrete. All brands of portland cement shipped into the Chicago area were used.

Functions of Researches

As this is written, active research in the new facilities had been underway for several months, but certain laboratories had not yet been sufficiently equipped to describe and discuss equipment facilities available for the enlarged research and development program. However, the functions of the various departmental sections and their objectives as well as the principal projects under study are of interest to those who are unfamiliar with the organizational set-up and scope of activities of the P.C.A. program.

Basic Research

The program of the basic research section is centered around studies of



Left: Rear of central wing of main laboratory building is three stories high to accommodate 1,000,000-lb. capacity compression testing machine, yet to be installed. Observation balcony connects east and west wings. Right: View, taken on the balcony outside rooms in the east wing of the main building, shows reeded architectural concrete piers, and ornamental precast concrete panels set into underside of overhanging roof deck



Hubert Woods, director of research, is a graduate of California Institute of Technology as chemical engineer. He was associated with Riverside Cement Co., Los Angeles, Calif., from 1923 until early in 1949, when he came to P.C.A. At Riverside, he was active in plant operating problems, research and other activities concerning the business end.



H. F. Gonnerman, after graduating from the University of Illinois with B.S. and M.S. degrees in civil engineering, remained at the university as instructor, later becoming a research associate professor. He came with P.C.A. in 1922, becoming assistant to the vice-president for research and development. He is the author of many papers on cement.



A. Allen Bates, vice-president for research and development, is well known for his work in the fields of chemistry, ceramics and metallurgy. His education includes B.S. degrees in chemistry and metallurgy and a Sc.D. degree from the University of Nancy, France. Before appointment to the P.C.A. he was manager of the chemical, metallurgical, and ceramic research division for Westinghouse.



William Lerch, manager of applied research, holds a B.S. degree from Beloit College and an M.S. from Wisconsin, both in the field of chemistry. He joined P.C.A. in 1923 as research chemist, but most of the time following this he was at the National Bureau of Standards under the Portland Cement Association Fellowship.



M. D. Catton, director of development, graduated from the University of Illinois in civil engineering. Work with the Illinois Division of Highways as engineer preceded his joining P.C.A. as a highway engineer. Before becoming director of development, he was manager of the Soil Cement Bureau of the association.



Harold H. Steinour, principal research chemist, received both M.S. and Ph.D. degrees in chemistry from California Institute of Technology. He was formerly research chemist for Riverside Cement Co., Los Angeles, Calif., before joining P.C.A. as senior research chemist in 1940.



I. L. Tyler, Field Service Section, is a graduate of the University of California School of Technology with a C.E. degree from M.I.T. He has had more than 20 years experience in construction of dams, power utilities and other large projects. Before coming to P.C.A. 9 years ago, he was with Pennsylvania Turnpike Commission.



Earl J. Felt, manager, Transportation Development Section, was a soils engineer with the Minnesota Highway Department following graduation as a civil engineer from University of Minnesota with B.S. and M.S. degrees. He formerly was with the Forest Products Laboratory of the U. S. Department of Agriculture.



C. F. Clausen, manager, Manufacturing Research Section, is a civil engineer with a degree from the Royal Polytechnic Institute of Copenhagen. He spent 13 years with F. L. Smith & Co., and during the war served the WPB as a cement expert. From 1945 to 1947 he was assistant to the president of Pacific Portland Cement Co., San Francisco, Calif.



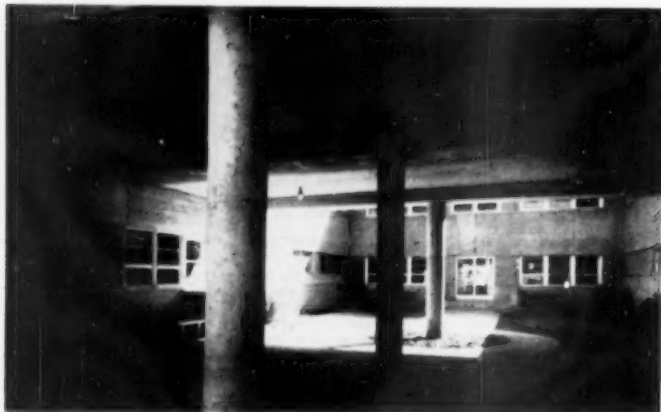
J. H. Walker, office manager, Research and Development Division, received a chemical engineering degree from Rose Polytechnic Institute. He was plant engineer for Louisville Cement Co. prior to the war, and during the war served in the Ordnance Department. He joined P.C.A. as an engineer after his discharge.



Clifford C. Carlson, manager of Structural Development Section, was engaged in research and development laboratory testing following his graduation from the University of Minnesota with B.S. and M.S. degrees in mechanical engineering. He joined Portland Cement Association in 1935.



Treval C. Powers, manager of basic research, received a B.S. degree from Willamette University, and later did postgraduate work in colloid chemistry at M.I.T. Following work as chemist for the Oregon State Highway Commission and as concrete technologist at Bull Run Dam, he joined P.C.A. as an engineer.



Main court, looking south toward lobby of main building

portland cement paste and was established because it was recognized some years back that progress in research was hampered because of lack of understanding of the nature of cement paste.

Among the types of researches, many of which have been reported in published papers and articles, are included studies of the bleeding of portland cement paste, rate of sedimentation, workability of concrete, frost resistance of concrete, dispersion of portland cement, air requirements for frost-resistant concrete, volume changes and many other important investigations.

Among basic research projects now in process are studies of the chemical constitution of cement gel, the kinetics of cement hydration, the physical chemistry of hardened paste, the physics of cement paste and hardened concrete, the physics of air entrainment and the chemistry and physics of air-entraining agents, to mention a few of the more pressing topics for study.

Applied Research

This section has 13 research projects underway and others are planned, all of which are designed to obtain data and information required for the promotion of quality concrete in all applications and under the various conditions of exposure which are encountered in the field.

Major emphasis currently is being directed to problems related to the durability of concrete, including among others studies of factors that determine the resistance of concrete to freezing and thawing, the effect of cement composition and fineness on durability, the compatibility of cement and aggregates, including alkali-aggregate reaction, and effects of differences in the thermal coefficient of expansion of the various materials.

Among new contemplated research projects are a study of fatigue in con-

crete with particular reference to its effect on the performance of concrete pavements, a study of the effect of the temperature of freshly-made concrete on the physical properties of the hardened concrete, and a study of bacterial action in its relation to deterioration of concrete under certain job conditions.

Field Service Research

This section has for its principal objective the study of concrete structures and means by which performance may be improved. Some of its work is directly concerned with the problems encountered in the field and also bringing the problems into the laboratory for study by various sections of the research department. Among the broad subjects under which the majority of field investigations of concrete performance are conducted are the effects of construction procedures, construction equipment, properties of materials and the kind of exposure.

Among current activities are the long-time study of cement performance in concrete which has been expanded during 1950. The original test projects of the long-time study are now six to nine years old. Each project is examined yearly in studying changes due to continued exposure in order to obtain a complete record of performance.

There are now four test roads under study. Among other projects are concrete exposed to sulfate soils, test piles in fresh and salt waters, concrete exposed in thin sections, and related studies of the manufacture of cements. The petrographic laboratory is another activity of this section.

Manufacturing Research

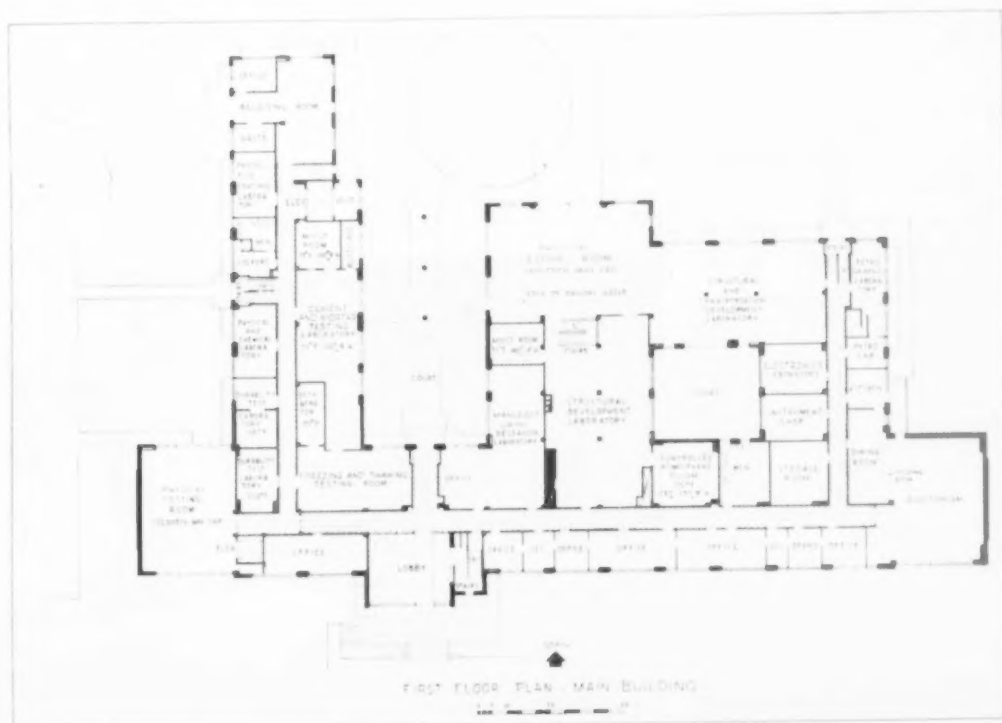
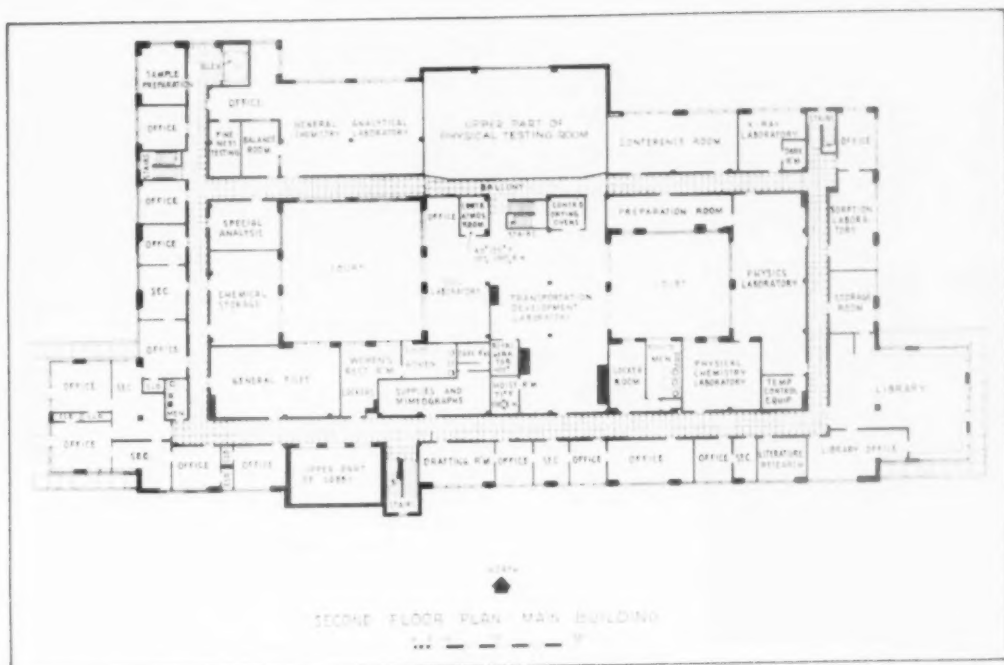
This section conducts research on the actual manufacture of portland cement with a view to perfection of plant processing for quality control and improvement of cement. Most of the studies pertain to the technology of cement manufacture, such as equipment and its performance, manufacturing methods, and effects of variation in fuel. Projects for study are selected on the basis of most universal interest and usefulness to member companies.

This work is accomplished through studies of the literature, laboratory investigations, pilot plant and industrial scale tests, questionnaire surveys and regular inspections of member company plants. The purpose of the program is to prepare reports and statistics of value in supplying information and advice to member companies to assist them in improving plant design and operation.

Among current investigations are a study of open-circuit vs. closed-circuit grinding of cement clinker; methods in attempting to reduce the water content of raw material slurry; a review of literature on rotary kiln operation; a comparison of so-called "old-time" and present day cements;



The executive office is located in the west wing of the main building



RESEARCH

a study of slurry viscometers, and centralized and automatic kiln controls.

Among contemplated projects for study are one on the relationship between grinding efficiency and grinding charge; the possible use of oxygen-enriched combustion air in rotary kilns; the use of anthracite coals; reduction of alkalis in kilns; the economies of waste-heat power and many

tion with engineering schools and technical organizations.

The structural development section has as its scope of activity new uses and techniques of construction exclusive of transportation applications, including prestressed concrete, etc., whereas the transportation section is concerned with applications of cement to problems of transportation, including highways, railroads and airports.

Literature Research

The literature research and library group is set up to serve all sections of the research and development laboratories and has a staff of five persons. The functions of the group are to maintain a library and to use the library as a research tool. As an example of the latter, the group supervisor has recently undertaken a review project on all causes suggested for abnormal concrete expansion including free lime, magnesia, unsound aggregates, alkali aggregate reaction. The approach of the study, for the purpose of arriving at explanations, is from the physical chemistry view point. It is true literature research.

Reference services will include a great deal of abstracting, bibliographic work, translation and literature searching to answer inquiries from personnel of the laboratories and member companies and for the engineering public.

Through this literature service and literature research, the experimental work of the laboratories will have greater opportunity to be most effective.

This group constitutes an important function of research and development and will have available for its work one of the finest libraries on cement and concrete that can be assembled.

Other Research

The Portland Cement Association first established research laboratories in Chicago in 1916 at the time of its organization, and until the new laboratories were completed, had conducted research at its Grand Ave. address in Chicago since 1926. The program of research and development has been expanding in scope since the beginning.

P.C.A. research is not confined entirely, by any means, to its laboratory investigations at headquarters and at Washington. It maintains field exposure laboratories widely dispersed throughout the United States and actively cooperates in many researches being conducted by engineering colleges and by private and governmental agencies.

Association Contributions

Among important contributions to cement and concrete technology have been the water-cement ratio principle of proportioning concrete mixtures, the development of soil-cement, an important part in the development of air-entraining portland cement and pressure grouting to stabilize highway and railway subgrades and tunnels. A major project expected to be of great public benefit is the long-time study of cement performance in concrete, started in 1940.

The Association has 67 member companies which produce some 90 percent of the portland cement used in the United States and Canada. Its major functions, other than research and development, include promotion, educational work and technical service to improve quality and to extend the uses of portland cement, and accident prevention work.



Closeup of one of the precast ornamental panels, set into the underside of the overhanging roof decks.

others. The staff now consists of six people which, with increased laboratory facilities, will enable a much more comprehensive study than ever before of plant operations.

Portland Cement Association Fellowship

Among current and proposed investigations by the Fellowship at the U. S. Bureau of Standards are the phase study of systems containing Na_2O and K_2O ; effect of SO_3 on the alkali phases in clinker; a phase study on the system $\text{CaO}-\text{CS}-\text{CA}-\text{CF}$ and crystal structure studies.

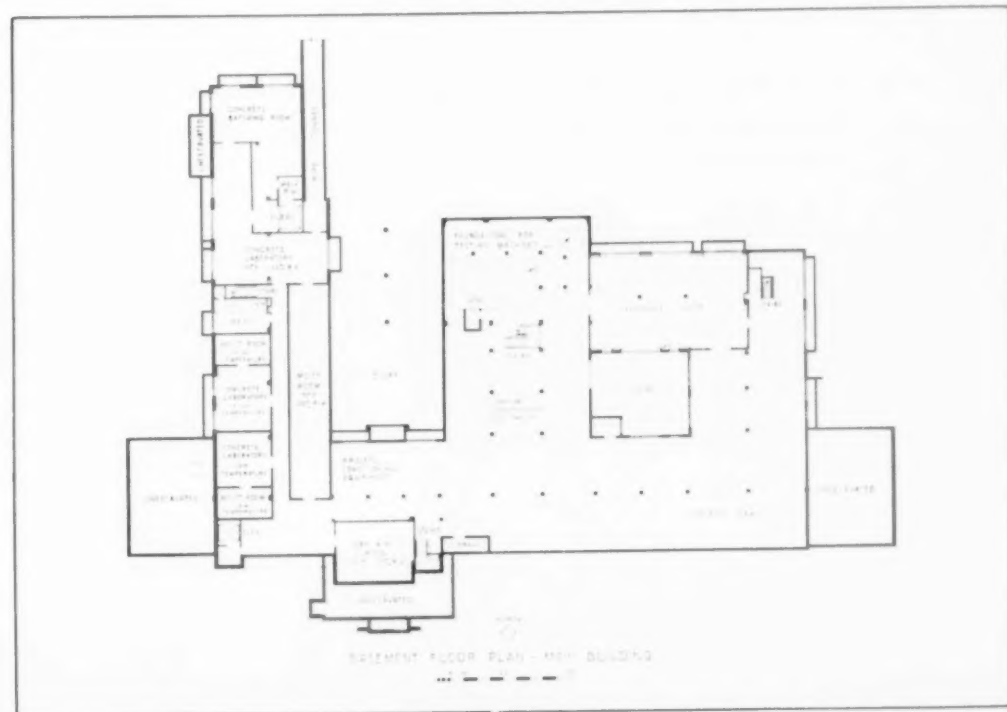
Among proposed investigations having to do with the control of the alkalis in the manufacture of portland cement are (1) to learn the relative potency of the various alkali cement compounds in their activity with reactive aggregates, (2) to study methods to convert active alkali compounds of clinker to inert phases, (3) to find means to effect volatilization of alkalis in the kiln, and (4) possible methods to rid the clinker of alkalis.

Development

The development department is concerned with the development of new or improved uses for portland cement and concrete. Much of the product development work is conducted in the P.C.A. laboratories but a great deal of the work is accomplished on field projects. Special investigations in some cases are undertaken in coopera-



Another view of the new laboratories, showing the auxiliary building at left behind the main building.



Aggregates



General view of Big Creek Dam operation with aggregate plant in center

Processing Granite Rock for Dam

Hydro-electric project dam in California has novel equipment features and design. Vacuum dewatering wheel used to dry manufactured sand as a control for proportioning concrete

THE SOUTHERN CALIFORNIA Edison Co. is constructing another dam as a part of its half-million kilowatt Big Creek-San Joaquin river hydro-electric project. The entire project is known as Big Creek No. 4 and includes a gravity-type dam 228 ft. high and 954 ft. long with a storage reservoir of 35,000 acre-ft. The power house will have 84,000 kilowatts of generating capacity. The project will cost \$20,000,000 by the time it is completed in 1951. The dam is about 50 air miles east of Fresno, Calif., and is being built under contract as a joint venture by Bechtel Corp. and Morrison-Knudsen Co., Inc.

Aggregate for this project is being processed at the damsite from granite rock, some of which is secured from a small quarry immediately adjacent to the plant; the balance of the rock is the broken stone taken from the large diameter tunnels that are a part of the project. The plant was designed cooperatively by the project engineers

By WALTER B. LENHART

and the staff of the Conveyor Co. of Los Angeles (Calif.) and embodies in it several new and novel ideas, each of which could warrant considerable study by those interested in plant design and operation.

Plant Features

One of these features is the use of a new type of sand wheel in which vacuum is applied to the bottom of the buckets through a porous filter medium. As a result of its rotation, it is essentially self cleaning and as such remains porous for a long period. More will be said later about this development. A second feature is the use of a spiral-type washer to wash all the minus $\frac{3}{4}$ -in. granite materials before further processing. This idea is emphasized somewhat by the fact that the raw material is granite rock

with apparently little or no foreign inclusions. The spiral washers were installed to make sure that all rock dust would be thoroughly wetted and the coarser fragments freed from attached rock dust before screening and sand processing. The spirals also remove any excess mica from the finer sizes of granitic materials. A third idea incorporated here is the use of a surge pile of minus 3-in. material instead of the more conventional surge piles of larger rock made from the crushed material from the primary crusher. Another development is the use of six sizes of aggregate for mass concrete as contrasted with the five sizes ordinarily used by the dam builders connected with the U. S. Army Engineers and the Bureau of Reclamation. Here five sizes of sized stone are processed, and these sizes are: plus 3-in. minus 6-in., plus $1\frac{1}{2}$ -in. minus 3-in., plus $\frac{3}{4}$ -in. minus $1\frac{1}{2}$ -in., plus $\frac{5}{16}$ -in. minus $\frac{3}{4}$ -in., plus $\frac{3}{8}$ -in. minus $\frac{5}{16}$ -in., and minus $\frac{1}{8}$ -in. sand,

AGGREGATES

1 to 13 percent of which is minus 100-mesh. The last two sizes could be classed as sand and at the Big Creek job they are so considered and kept separate.

Reclaiming Belts

Still another thought developed here is the use of two reclaiming belts under the $\frac{3}{4}$ -in. to 5/16-in. stockpile. One belt is for truck loading. The other is to have an additional source for rock to be used to feed the rod mill for sand manufacture. The plant has a capacity of about 300 cu. yd. per hr., and because of its arrangement and operation the output of each size of stone is surprisingly well balanced. No shortage or over supply of anyone size has developed.

Sixty percent of the raw material going to the primary crusher is from tunnel operations; the remainder is obtained from the quarry. Wagon drills are used for primary drilling with 22 ft. holes on 2 ft. centers that are stagger-loaded with 60 percent explosive and shot instantly with Primacord. The two tunnels that will receive the water from the dam and convey it to the power plant downstream are 2395 and 8130 ft. long and are 24-ft. horseshoe, unlined tunnels.

Tunnel Drilling

Work in the tunnels is on a three-shift basis, six days per week, and 200 ft. per week is about average progress, although some work records have been broken in driving these tunnels. The best six days' drive has been 243 ft. The rock from the tunnels is binned near the portals and later hauled by truck to a point near the crushers where it can be stockpiled and reloaded and trucked to the 36-in. Kennedy-Van Saun primary gyratory crusher. For loading in the quarry and at the stockpile, a Northwest shovel with a $2\frac{1}{2}$ -cu. yd. bucket is used. This loads



D. W. Lufas, job engineer for contractor, left, and E. A. Bray, aggregate plant superintendent

to a fleet of three 8- to 10-cu. yd. rear-dump Euclid trucks.

Batching Plant

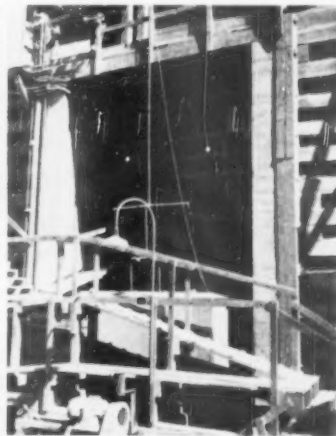
The plant is mostly of wood construction with conveyor galleries of steel. The crushed stone plant was assembled in eight weeks and two days. It will eventually produce enough material for some 280,000 cu. yd. of concrete, with the dam taking about 245,000 cu. yd. The concrete is processed at the batching plant near the dam, using automatic batching and weighing equipment supplied by the Noble Co. of Oakland, Calif. A 15-ton capacity Lidgerwood cableway spans the construction area delivering concrete in 4-cu. yd. buckets. The plant uses a 4-cu. yd. Koehring mixer. There are six aggregate bins at the batching plant and two silos for the bulk cement which is delivered in trucks from the Permanente Cement Co.'s plant near San Jose, Calif.

Darex for air entraining is used. The mass concrete will be cooled by water pipes embedded in the concrete.

The batching plant is about a half mile from the crushed stone plant. A fleet of International trucks is used to deliver the processed stone to the truck hopper that toes at an inclined belt conveyor serving the bins over the batching facilities. The quarry, crushed stone plant, and the six sizes of stockpiled material are so placed on the mountainside that the stockpiles radiate from the plant in a wide arc slightly above the road level. Short corrugated steel-lined reclaiming tunnels from each stockpile load the trucks at six different loading stations. This means that six trucks can be loaded simultaneously, if desired. The flow diagram will give the essential elements of the design of the plant and stockpiling.

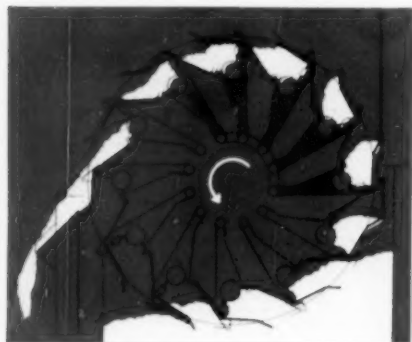
Sand Production

Though the sand is produced partly from quarry and tunnel muck, most of the sand requirements are met by manufacturing that material in a 6- x 12-ft. Marcy center discharge rod mill. This size of rod mill is the first one encountered in recent years in connection with sand production by grinding. Previously described mills have been mostly 8- x 12-ft. and 4- x 10-ft. This mill is producing 50 t.p.h. of minus $\frac{3}{8}$ -in. material and uses a 200-hp. motor. It receives its feed from the plus 5/16-in. minus $\frac{3}{4}$ -in. stockpile. Four hours' operation per day suffices for the plant's requirements, since some additional sand is produced as a direct result of the crushing and screening operations, but the rod mill plays no part in the production of that source. This set-up in itself is unique and worthy of attention, for at most of the previously described rod mill installations, the design of the plant was such that the rod mill ran almost continuously from a surge pile of essentially minus $\frac{3}{4}$ -in. material. Variable amounts of larger



Left: Twin 30-in. washing spirals, top, and rod mill below. Center: The 36-in. gyratory crusher sets in alcove. Right: View of 48-in. secondary crushing unit

AGGREGATES



Sand dewatering and classifying unit consists of a slowly revolving wheel set in a settling tank. Twelve buckets form the outside diameter of the wheel. Operation is shown herewith. Drying is accelerated by placing sand under vacuum as indicated by cross-hatched areas in drawing.

crushed rock bled into this surge pile so that the feed to the rod mill could vary over considerable limits resulting in possible variations in character of the sand produced. Here at Big Creek No. 4 the feed to the rod mill is one definite size. The mill started with a 29-ton rod load which has since been reduced to 23 tons. The mill at time of inspection had operated about five months, so no liner or rod wear data were available; however, the mill and liners were new at the time of starting and the operators state that the set of liners that came with the mill will easily last through the job. The rod mill started with a balanced load of 3-, 2½-, and 1½-in. rods, and 3-in. rods are fed to the mill from time to time as wear lowers the rod load.

Sand Machinery

The essential elements in the sand manufacturing plant revolve about a 4 x 14 ft. Ripl-Flo wet, two-deck vibrating screen, the Conveyor Co. sand wheel, and the rod mill. The top deck of the screen is 5/16 in. and the lower deck 3/4 in. The oversize from the top deck is the plus 5/16-in. minus 3/4-in. stone that is used for the rod mill feed. The intermediate size is the plus 3/4-in. minus 5/16-in. coarse sand size that is stockpiled separately. The minus 3/4-in. goes direct to the sand wheel.

Rod Mill

The rod mill is fed from a bin that has two reciprocating plate feeders which feed controlled amounts to each end of the rod mill. These feeders are 2 x 5 ft. The rod mill discharges to a chute serving a 7- x 16-in. Link-Belt bucket elevator that is 40 ft. high. Some trouble was experienced with these buckets dumping as the wet pulp settled rapidly in the bottom of each bucket. The operators reversed the buckets on the belt by bolting the lip section to the belt, and by punching two small holes in the bottom of each bucket to destroy the vacuum effect, the dumping problem was overcome. In the original design the bucket elevator discharged via a chute to a 4 x 8 ft. wet, two-deck Symons screen

that had 3/4-in. and 12-mesh wire on it. At time of inspection this screen was being by-passed and the pulp all chuted to the sand wheel. This screen was evidently not essential to securing a minus 3/4-in. sand since the rod mill's discharge contained so little oversize that additional screening was not required.

Crushing Plant

The crushing plant has a 36-in. Kennedy-Van Saun gyratory crusher with a capacity of 300 t.p.h. The secondary crusher is a 48-in. Traylor unit augmented by a 4-ft. standard Symons cone crusher. The KVS primary crusher discharges to a small steel hopper under which is a 36-in. apron feeder that delivers a uniform flow of rock to the 48-in. offbearing belt that serves the scalping screen. This unit is driven by a small U. S. Syncrogear motor.

The scalping screen is a 5- x 10-ft. dry, two-deck W. S. Tyler Co. screen that has a 6-in. top deck and a 4-in. lower deck. The oversize from the top deck goes to the 48-in. Traylor crusher. The plus 3-in. minus 6-in. material can go to its 24-in. stacker belt or a split can be made and all, or a portion of this size of stone, sent to the 48-in. gyratory. The discharge from this smaller gyratory crusher is conveyed back to the belt that offbears from the primary gyratory crusher.

A rather unusual feature here is that the minus 3-in. material from the scalper is belted on a long belt to a surge pile. This practice contrasts with the more conventional method of having a surge pile immediately following the primary crusher operation. Its use here can be studied to advantage, for evidently the amount of top size stone can be controlled somewhat by the discharge setting of the primary and secondary crushers, and there are obvious advantages of reclaiming a 3-in. stone as contrasted with 8- or 10-in. materials.

A reciprocating pan feeder (3 x 7 ft.) under this surge pile reclaims the material to a 24-in. belt that serves a 4 x 14-ft. Ripl-Flo screen, which is essentially a dry screen for most of

its length. However, water sprays at the extreme low end are used. The top deck of this screen is 1½ in. and the bottom deck ¾ in. The plus 1½-in. minus 3-in. crushed rock goes to its ground storage pile via an 18-in. belt conveyor. This storage pile has a live storage capacity of 1000 tons and a total capacity of 4000 tons. The capacities of the other ground storage piles can be seen from the accompanying flow diagram. The plus ¾-in. minus 1½-in. product is also belt conveyed to its stockpile.

Twin Screw Washer

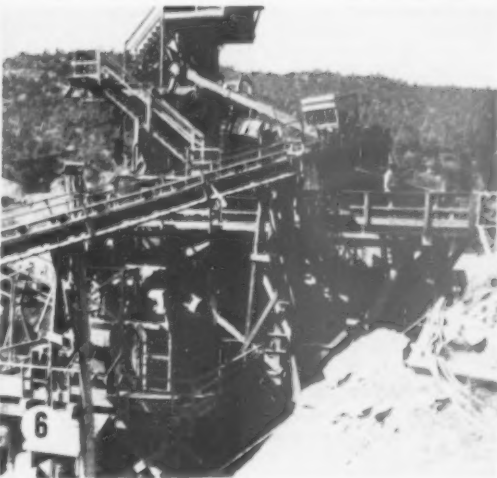
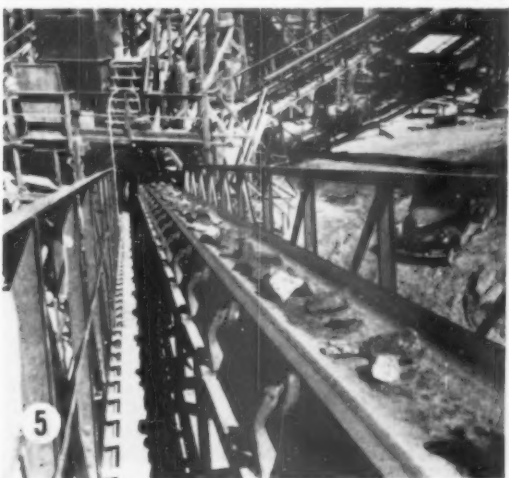
The minus ¾-in. material is belt conveyed to a 30-in. twin screw washer. This washer resembles in many ways the conventional spiral dewatering or sand classifying units, but here its purpose is to wet thoroughly the dry granite dust fragments, as well as to assist in the scouring of the dust from the larger rock fragments whose top size is ¾ in. It possibly has been observed by most of our readers that some rock dust when wet tends to form globules, the centers of which might be dry. These globules of extremely fine rock dust would get into the sand where they might or might not be desirable. To make sure that all the sand particles are thoroughly wet and separated, the designers have inserted this type of washer. The overflow from it, mostly fine slimes, is wasted. The use of a washer at this point on a strictly granitic material that from its very nature is free from clay or extraneous slime materials is in itself an innovation. The scrubber has a 12-ft. weir.

The washed oversize material from the twin screws is chuted to a wet, double-deck 4- x 14-ft. Ripl-Flo screen that has a 5/16-in. top and a 3/4-in. lower deck. The coarse sand (plus 3/4-in. minus 5/16-in.) is conveyed on an 18-in. belt to its storage pile. The minus 3/4-in. material is chuted with its water direct to the sand wheel previously described. The material from the top deck of this screen goes to the larger ground storage pile that has a live capacity of 2000 tons and a total capacity of 8000 tons. Thus it will be seen that the amount of plus 5/16-in. minus 3/4-in. material predominates. To keep the plant's total output of each size in balance, the operators have made provisions for reclaiming some of this 3/4-in. material as rod mill feed in the sand manufac-

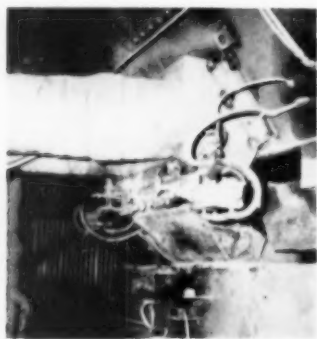
(Continued on page 106)

RIGHT:

(1) General view of Big Creek dam. (2) Six sizes of aggregates are stored over short reclaiming tunnels that radiate in a wide arc. (3) Minus 3-in. material forms surge pile reserve. (4) Aggregates are trucked to belt conveyor serving batching plant. (5) Largest size aggregate, plus 3-in. minus 6-in., going to stockpile. (6) Spiral washers can be seen upper right. Sand wheel is located lower center



AGGREGATES



Cement screws in batching plant

turing section. For this purpose there are two reclaiming belts under the pile, one for the rod mill feed and the other for serving trucks that deliver to the concrete batching plant.

Returning to the first mentioned Ripl-Flo vibrating screen, the plus 1½-in. minus 3-in. material can be sent to its storage pile, or a split can be made and all or a part of this material sent to the 4-ft. Symons cone crusher. The crushed material is belted back to this same screen.

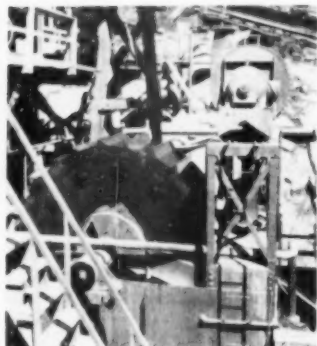
Sand Wheel

The sand wheel is 10 ft. in diameter and has 12 buckets that form the periphery of the wheel. Each bucket is equipped with a set of overflow louvers so that the surface water can be removed at once by decantation. The r.p.m. of the sand wheel has an important bearing on its capacity and on the dryness of the sand produced. Increasing the r.p.m. will increase the tonnage of sand produced, but at the same time will result in a wetter sand. The wheel operates at from ½ to 1½ r.p.m. and is provided with a 3:1 variable speed drive. In the bottom of each bucket and for its full length is a round brush which acts as the filter medium. Vacuum is applied to the under section of this brush and the water in the sand is thereby drawn off through the bristles of the brush. If this brush were stationary it could possibly become clogged with finer sand, but to obviate this possibility the designers have made provision to rotate the brush a fraction of a revolution each time the wheel makes one complete revolution, thereby providing optimum filtering conditions. The bristles of the rotary brush making up the bottom of each bucket are Bassine. These bristles are said to be stronger and tougher when wet and will last indefinitely.

Production Rate

Vacuum is created by a 3000 c.f.m. turbine air compressor that is mounted above the wheel. When the wheel is operated at a constant r.p.m. to pro-

duce a uniform fineness modulus, it will deliver a sand comparable with a product receiving two to three days of drainage in a ground storage pile. The machine operates entirely automatically and includes return water pump, drive motor, and vacuum blower. The long rotary brushes can be changed in about 10 minutes when necessary. The sand wheel at ¾ r.p.m. will produce around 75 t.p.h. of sand that has practically no migratory water. At 1½ r.p.m. the wheel will produce up to 125 t.p.h. with 1 to 2 percent more water in it than at the slower speeds. The manufacturer of the machine sometimes refers to it as a



Bottom of each pocket of sand wheel is made up of a long rotary brush. As the wheel revolves, the 5-pointed stars on the side engage a stationary finger in such a manner that the brush is given a partial revolution, thereby exposing a new and clean area for filtering sand

"sand dryer classifier," which in many ways is an apt name for the machine.

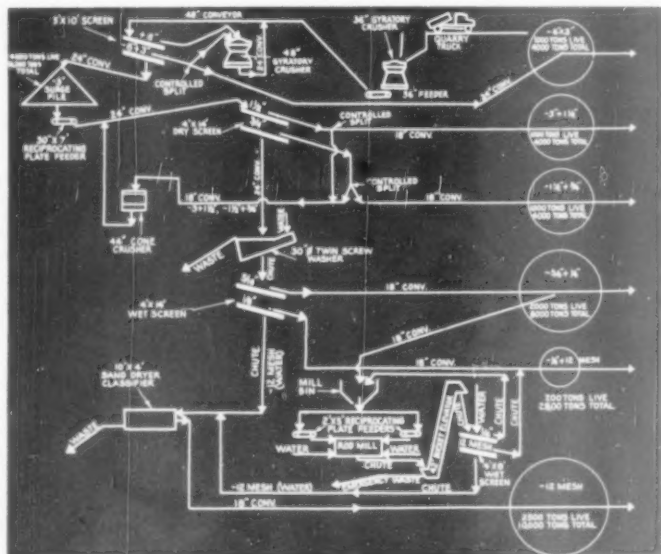
Sand Size

By referring to the flow diagram it will be seen that at the Big Creek dam the sand is all minus ½-in. and is produced from two sources, namely, the rod mill and natural screening of the crushed granite. Screen tests show that the sand has 12 to 13 percent minus 100-mesh material in it. Thus it is a sand comparable with masons sand and is much finer than the usual concrete sand. Even at this fineness, the sand as produced from the wheel is sufficiently dry to be in the crumbly stage and does not contain enough water to make it in any sense cohesive.

Moisture Content

To give the water content in percentages might be misleading, because this water content can depend too much on the type and character of the material being processed. However, after watching the sand wheel operate, it would appear that the material is about as free from surface moisture as it could possibly get without application of heat or by further evaporation. At this operation the sand is piled from its stacker belt into two piles by the use of a metal chute at the unloading end, which the operators refer to as a "pair of pants" so, if desired, the piles can dry by some surface evaporation for 24 hr. This fine sand is recovered by a reclaiming belt that operates in a steel-lined (corrugated iron) tunnel under the piles; no difficulty is experienced in getting the sand to flow easily to the belt.

The opinion was expressed that such



Flow of materials through aggregate plant

AGGREGATES

a sand wheel could be mounted ahead of concrete batching equipment in such a manner as to deliver a sand with constant moisture content to the weigh batchers and, where the concrete was to be used in mass concrete construction, such as big dams, the sand could be suspended in ice water, then filtered rapidly and used in the concrete before the sand could return to the ambient temperature. Thus the machine could point the way to better concrete by cooling the sand in a manner that parallels the cooling of coarse aggregate by drenching it with ice water in cooling towers (see September, 1949, issue of *Rock Products*, Rugg's Island aggregate production, p. 58).

Development of Dewaterers

The first vacuum sand dewatering and classifying machine using a brush-type filter bottom in each bucket was installed in a western sand and gravel plant several years ago. This unit had stationary brushes but the sand machine at the Big Creek project uses the rotary-type filter brush medium. The brushes rotate through a simple, fool-proof mechanism that consists of a five-starred end-piece on each brush. This end piece projects through the end frame of the filter. As the wheel revolves, one of the arms of this "star" engages a stationary finger in such a manner that the brush is made to revolve one-fifth of a revolution. The vacuum is applied to the under section of this brush in such a fashion as to distribute the vacuum evenly, which is in the 6 in. of water range.

Dam Project Area

The Big Creek No. 4 dam is one of several on the San Joaquin river. The

source of the river is in the heavy snow areas of the High Sierras, but where rainfall is limited. The Friant dam, a part of the Central Valley project, is downstream about 12 air miles. The Friant dam was built by the Bureau of Reclamation. Big Creek No. 4, while not actually in the High Sierras, is in the foothills to that section, which in any place but the West would be called mountains. The entire operations at Big Creek No. 4 are dwarfed by the mountain setting. Climatic conditions are such that full scale construction schedules can be maintained all year around.

Personnel

Paul Peacock is the Edison representative at the construction site, and with W. L. Chadwick, manager of engineering for Southern California Edison, directs the entire project for Edison. Engineering for the project is being handled in the joint venture office in Vernon, Calif. (Los Angeles area). The project is headed by John Kiely of the Bechtel Power Division as project sponsor for Bechtel Corp.-Morrison-Knudsen, Inc., with Jim Wells of M K responsible for dam and tunnel construction. At the work site C. E. Pehl is engineering manager, H. L. Leventon is construction manager, John Armitage, general superintendent on the dam, and Carl Herstoff, general superintendent of tunnels. Ron Lovely is office manager, W. F. Martin purchasing agent, and D. W. Lutes, construction engineer. E. A. Bray is superintendent in charge of the aggregate processing and quarrying section, and S. T. Brown is superintendent of the batching plant at the dam site.

Last Word on Pozzolans?

THE EDITOR: Let me add my voice to the babble on pozzolans. I am prompted to add my piece after seeing Paul Seguin's letter published in the March issue of *Rock Products*. I think both you and Mr. Seguin are off base when you say the word comes from the French. Webster's unabridged dictionary credits its origin to the Italian language, which certainly must be right because the town of Pozzuoli is in that country and not in France.

I am sorry that you again stir up the confusion regarding the spelling of this term after so many of us thought the point was settled. Some time ago when we wrote early editions of the Concrete Manual we put some of our best grammarians on the problem of how best to spell this word. A great many letters were sent out to those technical men who had used the term, requesting their opinions. I don't know whether you were on the list or not, but after some deliberation we finally reached the decision to spell the term "pozzolan." We felt we were justified in this because Webster so lists it, although he does put the final a on it. Webster does not recognize the word puzzolan. And contrary to what you say, it is not so pronounced.

Regardless, whether we are right or wrong, we long ago decided that we would do what we could to end the bickering on the subject and attempt to get all technical writers to spell it the same way. That is what Professor Davis meant when he said, "Among technical men in this country the preferred spelling of the word is pozzolan." As one who does a lot of writing will you please help us end the confusion and not add to it.

H. S. MEISSNER,
Research Engineer,
Bureau of Reclamation,
U. S. Department of the Interior,
Denver, Colo.

April 21, 1950

EDITOR'S NOTE: Mr. Meissner and others interested may rest assured that we will conform.

— N. C. R.

Cement in Western Germany

CEMENT OUTPUT in Western Germany showed a considerable increase during the last months of 1949 due to revival of the building trade, *Mineral Trade Notes* reports. Almost all plants are in operation again with a total annual capacity of about 13,000,000 tons. Approximately 80 percent of that capacity is not being utilized. Housing construction, which experienced a slump at the beginning of 1949, improved considerably during the second half of the year, but construction of commercial building predominated.



Shovel loads granite rock stockpiled from tunnel driving operations



New rotary drill in use at Thornton quarry

ROTARY DRILL SPEEDS QUARRY OUTPUT

Thornton quarry of Material Service Corp. uses a rotating bit kept under continuous pressure by hydraulic power to drill blast holes

IN THE CRUSHED STONE industry, power and man-hour requirements in the plant are fairly well stabilized, but in the operation of many quarries there are opportunities for effecting substantial savings. At the Thornton quarry, Thornton, Ill., of Material Service Corp., Chicago, which produces over 1000 t.p.h. of crushed stone, the drilling operation is currently undergoing major change in the interest of operating efficiency and economy.

In the past, five churn drills have been required to sink sufficient blast-hole footage to keep two 5-cu. yd. power shovels supplied with stone. However, in the future, use of one or possibly two new rotary drills of a type developed in the oil fields will be sufficient to meet plant requirements.

Pressure-Type Drill

The new drill, a Joy Champion Heavyweight, sinks blast holes by continuously exerting hydraulic pressure of 700 p.s.i. on a Hughes tri-cone roller bit that revolves at 80 r.p.m. when the rig is in high gear. The bit is formed by three cones that have their small diameters pointing in to the center of the completed unit. The shape of the bit assembly is in itself conical, and the three cones are free to revolve, each on its own axis. By virtue of a series of lugs formed on the surface of the cones, stone is effectively chipped away. Insufficient bit-cost data are available from operation of this drilling equipment to date, but the company, on the basis of experience thus far, believes that cost per foot drilled will be about the same for the new bit as compared to the churn drill bits used formerly. (For drilling experience with this type of rig in a different formation, see *Rock Products*, November, 1949, p. 79.)

This operation is using the first

drill of the larger size to utilize compressed air for removal of excess chips and dust from the hole instead of water as in former models. A 300 c.f.m. air compressor, powered by a 75-hp. motor, is mounted as an integral part of the unit. By using air to clean out the hole, extending water lines to the drill rig becomes unnecessary.

Type of Deposit

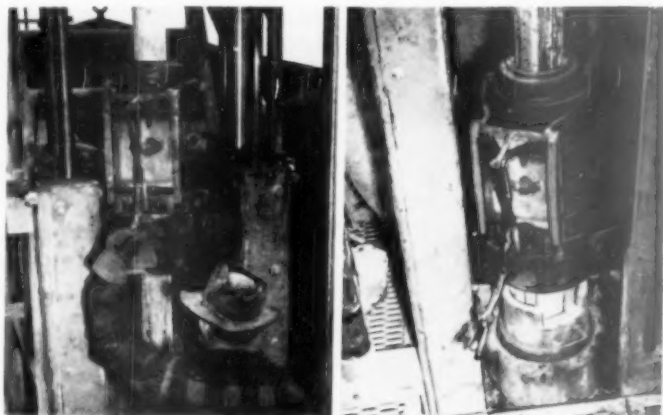
Paul C. Blaise, works manager, has stated that this is the most significant improvement in limestone blast-hole drilling in 35 years. He is of the opinion that the new drill will produce footage in excess of that produced by four percussion-type drills. Stone at this quarry, which is possibly the largest commercial operation in the United

States, is a moderately hard dolomite of the Niagara formation.

It is difficult to give an all-inclusive figure on drilling speed due to the differences in the hardness of the different strata, and, for the same reason, to predict performance when used in other rock formations. It is only through comparison of this drilling rig with other types of blast-hole drills, when drilling identical material, that an estimate of comparative performance can be made. The drill produces more footage per unit of time than four churn drills.

Bit Wearing Quality

Life of the bit in constant service at this quarry is approximately 1700



Left: Hydraulically controlled collar at top of 4 ft. stroke. The man's hand is on control lever that grips square drilling steel so that downward pressure may be exerted on drill bit. Right: Collar at bottom of stroke

DRILLING

ft., although it has been observed that, after the bit has passed the 1000 ft. mark, the rate of penetration tends to decrease. Square drilling steel measuring 4 x 4 in. is used with this machine. The 20 ft. lengths of steel are raised from the hole by a 2-drum winch powered by a 50-hp. motor and controlled through a twin-disc clutch.

At present, 6½-in. dia. blast holes are being drilled to a depth of 54 to 59 ft. Mr. Blaise states that a change to an 8-in. diameter hole is contemplated to cut down the number of holes drilled per blast and because the larger diameter holes seem best adapted to the type of stone and depth of blast hole at this quarry. Holes produced by the new drill maintain smooth, straight sides for their entire depth, regardless of seams, pockets or types of material encountered. Present practice is to drill two rows of holes, staggered, with 18-ft. burden and 12-ft. spacing. The front row is shot first through split-second delays with the second row following later as a separate similar blast. With the larger diameter hole, burden will be increased to 21 ft. and spacing to 14 ft., keeping the ratio of powder to burden the same.

Blasting Method

Split-second delay-action blasting as practiced at this operation is accomplished with a du Pont timer. Delay time between holes is 20 milliseconds. Tons of stone brought down per pound of powder vary from 2.7 to 3. Very little secondary blasting is necessary as fragmentation is usually complete. In fact, a portable compressor and jackhammers for second-

ary work need be brought in after fewer than half the shots. The services of Vibration Measurement Engineers are used periodically in order to obtain a check on blasting efficiency.

Electricity is used to power all major quarry equipment including the two shovels and the new drill, which uses three motors of 75, 50 and 5 hp. to drive all the mechanism. Motive power is furnished to the crawler



Tri-cone roller bit being raised from blast hole

treads from the 50-hp. motor, which is capable of driving the rig at speeds up to 5 m.p.h. when moving to a new location. This same motor also powers the rotary action of the drill when the rig is set up over a blast-hole site. Rotation of the drill steel is controlled through a 4-speed transmission with rotation speeds of approximately 20, 37, 51, and 80 r.p.m.

Hydraulic Pump

A hydraulic pump is chain-driven from the same 50-hp. motor to produce 700 p.s.i. pressure for the two main hydraulic functions of the unit. Pressure on the drill bit is maintained hydraulically through a 4-ft. stroke that functions through a yoke or collar that grips the drill stem. Upon completion of a stroke, the collar is raised for the next stroke. A second use for the hydraulic system is for leveling the rig when setting up for drilling a blast hole. This is accomplished by three jacks, two at the front end and one at the back, all controlled from a central location. The derrick used for handling drill steel, which is hinged about 8 ft. above the platform of the unit, is raised or lowered hydraulically.

Chip Removal

Compressed air is introduced into the top of the hollow drill steel and upon issuing from the bit serves to carry excess dust and chips to the surface. An inverted conical collar over the hole collects this material, which is then piped to a Roto-Clone cyclone-type dust collector, powered by a 5-hp. motor. At the bottom of this unit a

hopper holds the collected dust and chips which are periodically emptied to the ground below the machine. Chip size depends on the hardness of the stone being drilled and the condition of the bit. The harder the stone and sharper the bit, the larger the chip size. At this operation average chip size is about ½ in. in diameter.

Aggregate from the Thornton quarry passes all state specifications. Flow through the plant is flexible inasmuch as several widely divergent end products can be made simultaneously without having to change screen or crusher settings, merely by throwing flop gates. Portland cement concrete aggregate, agricultural limestone, sintered dolomite and fluxstone for steel mills, binders and fillers for roofing plants, fertilizer filler material and stone for hot-mix plants are among major items produced at this plant. The quarry has been in operation for 45 years. Since 1939 it has been under the control of Material Service Corp.

Canadian Gypsum

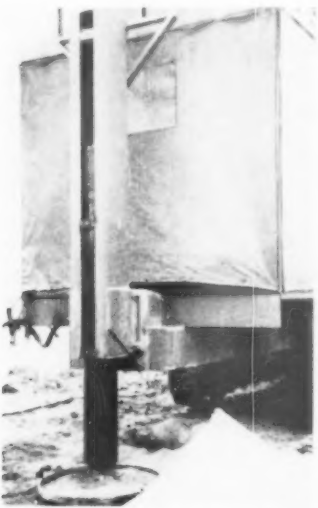
A REPORT on gypsum mines in Canada, released recently by the Canadian Department of Mines and Technical Surveys, describes the many large deposits of gypsum which occur throughout Canada, the most extensively mined being those in Nova Scotia and New Brunswick where the mineral is exposed in cliffs from 50 to 200 ft. in height in many places. The quality of gypsum in Canada, particularly the white variety found in Nova Scotia, New Brunswick and Ontario is of exceptionally high grade, and a considerable tonnage is shipped to calcining plants in the United States.

Canada produces about 8 percent of the world output of gypsum, and about 38 percent of the output of the British Empire. Canadian gypsum production in 1948 amounted to 3,216,809 tons valued at \$5,548,245 compared with 2,496,984 tons valued at \$4,734,853 in 1947.

Anhydrite (anhydrous calcium sulfate), of which only a small amount is produced, is exported principally as a fertilizer for the peanut crop in the south of the United States.

Stereoscopic Movies Shown

BARBER-GREENE Co., Aurora, Ill., has held very successful showings of its three dimensional color movie entitled "Highway U.S.A." This film is a tribute to the road builders of America and shows many scenes of both scenic and construction interest. The illusion of three dimensions is created by projecting a stereo pair of pictures on the screen, each image polarized oppositely. By means of special glasses, the viewer can "fuse" the picture into a three dimensional image. Production of the film was directed by J. D. Turner, director of publicity.



Closeup of one of three hydraulic leveling jacks, all of which are controlled from central point



General view of plant showing collecting lines which convey material to top of the washer building

Producing a Variety of Silica Products

**Standard Silica Corp. uses pebble mills and conical mills
in the production of silica flour at its Ottawa, Ill., plant**

EQUIPMENT THAT WILL almost double the output of silica sand and silica flour has been added to the plant of Standard Silica Corp., located at Ottawa, Ill. An area known for the high purity of its silica sand deposits. This outcropping of St. Peter silica is found on both banks of the Illinois river just below its confluence with the Fox river. The deposit on the south bank is worked out and all active excavations are located on the north side of the river, about seven miles above historical Starved Rock State Park.

Standard Silica's operations are adjacent to those of the Ottawa Silica Co., and the primary means of sand recovery at the two properties are largely the same. For a detailed account of this type of mining operation, see the description of Ottawa Silica's mine in *ROCK PRODUCTS*, November, 1944, p. 44. "Mining Silica Hydraulically."

Briefly, operation of the Standard Silica Co. excavation consists of stripping approximately 5 ft. of overburden with a $1\frac{1}{2}$ -cu. yd. shovel, drilling

blast holes and shooting the consolidated sandstone which disintegrates readily into its grain sizes. Silica is then hydraulically washed into a sump box through a $4\frac{1}{2}$ -mesh screen by high pressure monitors. Material is transferred from the sump to a battery of rubber-lined centrifugal pumps by hydraulic elevators. The silica is elevated a total of 110 ft. from the pit floor to the plant washing facilities. The pit face is approximately 65 ft. in height.

New Equipment in Use

Recently an Allis-Chalmers Low-Head screen, and an Allis-Chalmers 3000-g.p.m., 250-hp. pressure pump driven by a 500-hp. motor have been added to increase efficiency of pit operations. Standard Silica's processing plant is of particular interest in that ten grades of sand and five of flour are produced with two types of machinery relatively new to the silica processing industry: Dorr hydroseparators and a Marcy pebble mill for silica flour reduction.

One hydroseparator has been in al-

most constant operation 8 hr. per day for six years, and because it has proved highly efficient in this plant, a second is to be installed shortly to run in tandem with the one now in service.

Hydroseparator Operation

Receiving material directly from the excavation at the rate of 1200 tons of solids per day in a solution containing 25 to 30 percent solids by weight, the separator discharge is 50 to 60 percent solids. Since its installation, the hydroseparator has washed approximately 1,500,000 tons of sand at a negligible maintenance cost.

The trend towards larger mills for silica grinding at Standard Silica is typified by recent installation of the 10-ft. 8-in. x 12-ft. 4-in. Marcy pebble mill. This mill is believed to be not only the largest in the industry, but also the first such mill for dry grinding of silica. Pebble consumption, tons ground per horsepower, and maintenance costs are satisfactory. In addition, four conical Hardinge mills are operated.

Flint pebbles are used in all five



Prepared, dry silica is conveyed to storage bins where it is stored in accordance with its granular classification

mills. The new mill is the two-trunion type with water cooled bearings and is driven through a Gates V-belt drive from a spur gear and pinion, powered by a 200-hp. motor. Material discharged from the mill is elevated to a 14-ft. Raymond double-whizzer air separator. The finished product flows by gravity to a concrete storage bin; the coarse are returned to the feed-end of the mill.

The silica flour is discharged from storage to a Fuller-Kinyon pump, which conveys the material to overhead storage bins for bagging or direct into hopper cars as desired.

The mill was placed below the packing floor level so that the sand can be conveyed by gravity in a pipe line to a concrete silo erected above

the mill on the packing floor. This position is such that all five mills are located in one building on one side of the loading track and two on the other side, and the new mill is able to fit into plant flow without drastic changes in storage bin or material flow.

Sand Washing

Material fed the plant from the pit is first discharged to the hydroseparator, as previously mentioned. The underflow from the hydroseparator, is piped by gravity to washing bins through 6-in. lines fitted with Masco pinch valves. Water for the washing operation is supplied by a 1000 g.p.m. American Well Works pump driven by a 100-hp. motor. Material leaving the wash tanks, 30 to 40 percent solids by weight, is elevated to drain bins by a rubber-lined Allen-Sherman-Hoff centrifugal pump. The sand is allowed to drain in these bins for approximately eight hours. Water drains from the top over a false wall in one corner of the bin and from the bottom through a false bottom angled at 45 degrees and underlaid by cinders as a filter bed.

Discharge from the drain bins is by gravity to a 24-in. belt conveyor which carries the material, now containing less than 5 percent moisture, to a bucket elevator on 28-ft. centers powered by a 5-hp. motor. Sand from the bucket elevator is diverted to one of two steam coil dryers by flop gate. Dry silica is discharged from the bottom of each dryer by gravity through a series of 1-in. holes over a 12-in. belt conveyor. This conveyor transfers the material to a second bucket elevator on 120-ft. centers powered by a 15-hp. motor for elevation to the top of the screening building; the conveying equipment was furnished by



End view of grinding mill

Stephans-Adamson Mfg. Co. Material is discharged from the elevator to a Ty-Rock scalping screen. The sand passing the screen is carried by a short conveyor belt to a flop gate system for equal distribution over eight single-deck screens, four on each side of the building. On the next floor below are located 14 double-deck 3- x 10-ft. vibrating screens, seven on each side. On the next lower floor are six double-deck screens, three to a side, each receiving partial discharge from two screens on the floor above. All screens in this operation other than the primary scalping screen are Tyler Hummer units. All double-deck screens are fitted with two mesh sizes per deck. Finished material plus feed for the pebble mills is taken off at various levels in the screening system and chuted to storage bins.

The ten grades of silica sand usually produced range from sandblast sand with a grain fineness of 25 to a fine silica sand having a grain fineness of 81. A close laboratory control of grades is maintained at all times.

Pebble mills for the production of silica flour are fed a "run of mine" grade of sand which tests as follows:

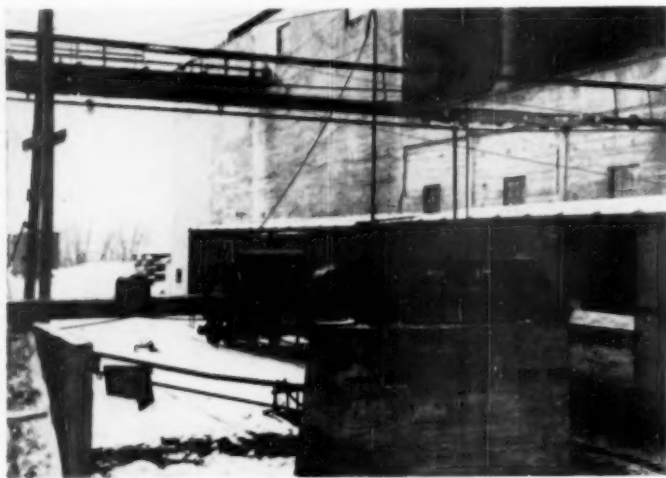
Run of Mine (Mill Feed)		
Screen Retained On:		Percent Retained
20 mesh		6.2
30 mesh		5.8
40 mesh		30.8
50 mesh		34.2
70 mesh		18.3
100 mesh		9.9
140 mesh		1.6
Pen		0.1

Grinding Mills

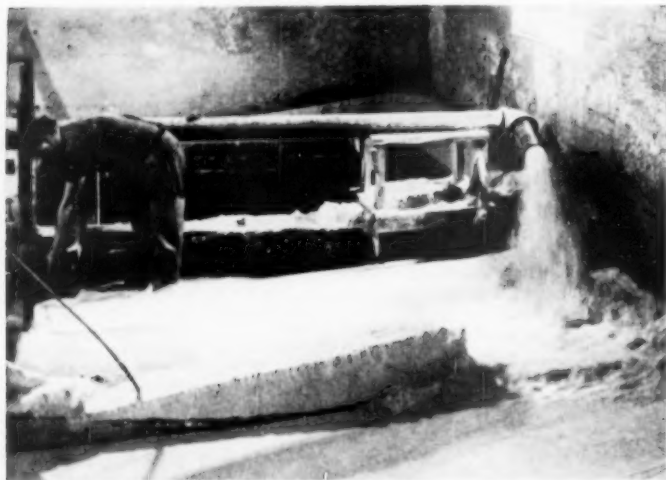
The finished product varies from 75 percent through a 200-mesh screen to 95.87 percent through a 325-mesh screen. The four granite block lined Hardinge pebble mills are the air-swept type. The first two to be installed are both 8 ft. x 66 in., V-belt driven by 75-hp. G. E. motors. The third mill is 10 ft. x 66 in. and the fourth is 8 ft. x 72 in. The third mill is the largest conical-type mill in the silica industry. Air for the operation



Deposit of St. Peter sandstone, partially disintegrated by blasting



Car loader consisting of belt conveyor on movable arm that can be extended into car



View of 80-ton sand drain bins. Water flows off from top and sand discharges out bottom

of the mills is provided by Claridge fans rotating at 3600 r.p.m. Pulverized silica from these mills is discharged direct from product collectors to storage bins.

Finished mill products are shipped either in multiwall valve-type paper bags or in bulk paper-lined box cars or closed hopper cars. Material to be packed in bags is drawn from the proper bin by a screw conveyor to a feed hopper over a packer. There are two such systems, one for each of two double-valve Bates packers. For bulk loading of pulverized silica (flour), a Redler conveyor elevates the material to a platform above a rail-

road siding, from which it flows by gravity into the cars. A Manierre car loader is used for bulk loading of silica sand. This equipment has been modified by Standard Silica Corp. and consists essentially of a belt conveyor mounted on a movable arm that can be extended into the car. A box car can be loaded in 15 to 20 minutes.

Dust Collection

A Blaw-Knox dust collector system draws dust from both the top and bottom of all screens, while Pangborn collectors are used in other parts of the mill. These collectors are the bag type. The installation of two units

allows one to be emptied while the other is in use. Most dust collected is of a grade suitable to be returned to the regular flour bin. The mill is also equipped with a Spencer Turbine Co. vacuum cleaner, consisting of one central unit with pipes and outlets radiating throughout the mill. As an additional means of dust abatement, water that is used to wash down the floor in such places as under the dryers is flushed through a system of newly-driven tunnels leading from under the mill to an abandoned mine adjacent to the plant.

In addition to its open-pit type of mining, the company has recently instituted a program of underground mining, and in that connection has installed rather extensive and novel facilities for the underground mining of the celebrated St. Peter sandstone.

The executive offices of Standard Silica Corp. are in Chicago. Hamilton Allport is president, and A. D. Bryant is vice-president and plant superintendent.

Diamond-Drilling Report

THE BUREAU OF MINES has released a report reviewing the cost and performance factors involved in the diamond drilling of gneiss, a hard, crystalline rock resembling granite, which frequently contains mica, feldspar or quartz. Information gathered by the Bureau on the use of diamond core bits for drilling gneiss reveals that bits set with Congo diamonds are the most economical for use at current prices. The study made by the Bureau also showed that, regardless of the quality of diamond used, the footage drilled per bit was highest and diamond loss and bit costs per foot drilled were lowest when the bits were set with small-sized stones. Diamond losses and bit costs increased as the percentage of core recovered decreased. The publication contains statistical tables illustrating phases of this cost study, sectional views of the bits employed, character and physical properties of gneiss, type of bits and core barrels used, diamond size, quality and selection and effects of diamond size and grade on bit cost.

A free copy of Report of Investigations 4628, "Effects of Core Recovery, Diamond Size, and Quality on Cost of Core Drilling in Gneiss" by Albert E. Long, Bureau mining engineer, may be obtained by writing to the Publications Distribution Section of the Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Penn.

Explore Pumice Claims

PANTHEON PUMICE CORP. will begin exploration of pumice claims in New Mexico shortly, according to Dudley Cornell, Albuquerque attorney. The new corporation has 17 placer claims in the vicinity of the Santa Clara reservation.

HYDRATED DOLOMITIC LIME PRODUCED IN SMALL PLANT

Ladd Lime & Stone Co. produces lime from high grade deposit in Georgia; product is particularly suitable for application to soils in improving agriculture



Col. Louis J. Lampke

MANUFACTURER of a high quality dolomitic hydrated lime, the only lime of its kind in this Southeast region, Ladd Lime & Stone Co. conducts its operations at Cartersville, Ga. The present quarry was opened in 1866 and since that time has been in almost continuous operation. During this long period of 84 years, the lump and hydrated limes have been marketed over a wide area. Because of the chemical composition of the stone from which the lime is made, it now is in increasing demand in the chemical field. The supply of this quality stone in the quarry, adjacent to the plant, is unlimited. Ingersoll-Rand and Jaeger air compressors are employed with Ingersoll and Cleveland wagon and jackhammer drills. DuPont dynamite is used. Natural gas from the Louisiana field is used for fuel in

the entire plant for both vertical and rotary kilns. The lime is marketed under the trade-mark brand LADCO.

The firm's agricultural lime now is desired because of its high magnesium content. Magnesia is a food for all farm crops and, as well, neutralizes acids in all soils. This agricultural lime is burned, is not a raw ground stone so often sold as lime, and is said to give results in the sour, acid soils of fields and pastures immediately after it is applied.

During 1935 the company built a modern plant for the production of brick mortar, plaster and stucco. White shale, a combined silica and alumina material free of iron, is burned in a rotary kiln at the correct temperature to produce a material of such qualities that when it is processed with other materials it results in a silicate and

aluminate product with an acid, rather than an alkali, content. The finished material is white and non-staining, more plastic than most mortars, is hydraulic, with no free lime, sticks to the brick, shrinks less and leaves fewer cracks, according to the producer. This mortar is sold under the trade name BONDLO.

Recently Col. Louis J. Lampke took over the management of the company. He previously had 29 years service in the Army and is now on the U. S. Army retired list. Roll N. Soper is the chemical engineer and assistant manager of the firm; W. C. Arrant is superintendent; Thomas McGuire is assistant superintendent in charge of the lime and mortar plants; J. H. Wofford is sales and office manager, and Raymond G. Crowe is assistant to the general manager.



Lime burning and processing section

Retirement Agreement by Ford Motor Company

A MIMEOGRAPHED COPY of the retirement and health program agreement between the Ford Motor Co. and the U.A.W. (C.I.O.) has recently been sent to members by V. P. Ahearn, executive secretary of the National Industrial Sand Association. Mr. Ahearn states that while the agreement in question has been the subject of considerable newspaper discussion, very few members apparently have been able to obtain the complete text. "It seems clear that almost every company which must deal with a labor union will have to contend with the subject of retirement and pensions incorporated in a collective bargaining agreement," he continues. It is also stated in the covering letter that the Association has no policy with respect to such matters, and that the copy of the agreement is sent to members purely as a matter of information.

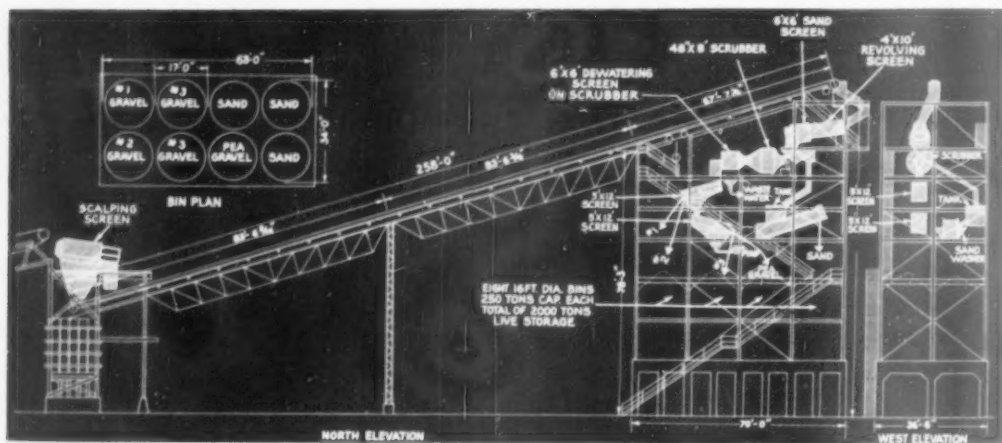


Diagram of flow of materials at Orange plant plus details of bin arrangement

Gravel Plant Features Removal of Impurities

Consolidated Rock Products Co. solved the problem of removing sticky clay inclusions at its Orange County operation by installing a conical scrubber and dewatering units

CONSOLIDATED ROCK PRODUCTS CO. of Los Angeles is the largest producer of sand and gravel and crushed gravel in southern California, and one of the largest producers in the United States. Its Irwindale and Roseme plants are probably better known than some of the other operations. The Irwindale plant was the one visited by members of the National Sand and Gravel Association when they held their annual convention in Los Angeles in March, 1947. The Orange County plant is almost due south of the Irwindale plant and about 45 miles from Los Angeles.

Orange County, as the name implies, is in the heart of the citrus growing section of southern California. The country is relatively flat and sources of gravel are not too extensive. The Orange County plant is located near the city of Orange. The plant and pit are surrounded by productive orange groves.

Clay Inclusions

Because of the many years that the plant has been in operation, shallow excavations in the pit now cover a considerable area. Gravel without any clay strata existed in the deposit down to 12 ft. depths. This material needed

By WALTER B. LENHART

no unusual or elaborate washing and processing plant to deliver a high grade product. But as the years of production mounted, this type of material became almost depleted. The deposit could be cited as an elementary example of depletion as applied to the sand and gravel industry, for to the



Arthur W. Sanderlin, general superintendent

casual observer here was a deposit that seemed to have unlimited life; however, when the two factors of economics and production are considered, the deposit had a life span that was relatively short. Thus the life of the deposit was measurable by the tonnage, or cubic yards, it could produce, and when economics enters the picture, one should say *produce at a profit*. Here was a deposit that became depleted in every sense of the word, and the only way to keep the operation alive was to start all over with practically a new approach. Below the 12-ft. level in the pit there were known to be extensive deposits of the same excellent sand and gravel, but included were strata or lenses of clay. If a suitable washing system could be devised to eliminate the clay, it was felt that a new era of production could be carried on for many years in the future.

The several strata or veins of clay, that are in the deeper portions of the deposit, are 18 in. or more in thickness and then feather out to lesser thicknesses. These beds of clay are of two kinds. Some are a mixture of very fine sand and clay and others are practically all clay, which when wet is very sticky and difficult to wash and

AGGREGATES

process. The sand and gravel in these lower beds is an excellent material and as now processed in the new washing plant is making an excellent product, one that meets every federal, state and local specification.

Design of Plant

As a preliminary step in the design of a washing plant to handle a gravel product high in clay, Ronald C. Griffin, production manager for Consolidated Rock Products Co., made an extensive trip through the East visiting many plants whose owners had similar problems. He came up with the answer to this problem by installing a Hardinge conical scrubber. After several months of operation the unit has fulfilled expectations in regard to quality of output, simplicity of operation, tonnage handled, mechanical aspects, and its overall economy of operation.

Dry Process Section

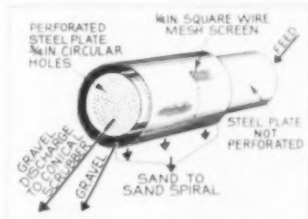
In making a study of the flow sheet of the Orange County plant, one should bear in mind that in that area a crusher-run base material must be processed dry and that this type of product finds a considerable outlet in the area. Thus a washing plant had to start after the scalper or crusher-run base screen, even though the clay inclusions at times might slow down the primary screening operation. This fact led to the adoption of a washing scheme that would permit the crusher-run base material to be taken out early in the operation and to wash only the minus 1½-in. gravel and crushed gravel. The primary crushing plant consists of an 18- x 36-in. Farrell-Bacon jaw crusher and two 4 ft. Symons cone crushers equipped with standard heads for the secondary crushing. A rotary "bull" screen prepares the minus 1½-in. material for the new washing section and delivers that material to a long inclined 24-in. belt conveyor that serves the washing

section. That part of the plant which includes the bull screen is a part of the older operation and was described in the December, 1945, issue of *Rock Products*, p. 100.

Another major consideration when designing the new plant was to have no bucket elevators or belt conveyors handle a wet product that would result from a thorough scrubbing operation. It has been the experience of these operators that a bucket elevator on a wet product would cause a bottle neck because of difficulties in the dumping of the buckets. Belt conveyors handling a wet product also have obvious undesirable features, so the designers mounted the scrubber on one of the uppermost decks of the new structure. To be exact, the scrubber is 78 ft. 3 in. above the ground line.

Conical Scrubber

The scrubber is an outgrowth of experience gained by its manufacturer, the Hardinge Co., York, Penn., in



Details of preliminary scrubber

washing phosphate rock in the Florida fields. It is essentially a conical ball mill lined with replaceable manganese steel liners. On the discharge end has been affixed a cylindrical dewatering screen that revolves with the scrubber. No grinding medium is added to the scrubber but some lifting action is obtained by the type of liners used in



General view of washing plant. Washer is at center of larger top deck

the scrubber. The unit operates wet and scrubbing and disintegration of the clay is obtained by the tumbling mass of gravel in the scrubber. This machine is an 8 ft. x 48 in. unit and has a 6- x 6-ft. dewatering screen on the discharge end that has 3/16-in. punched holes in a 3/16-in. plate. The throughs from this screen, small in amount, go to a Wemco sand washer. The scrubber weighs 38,000 lb. empty, and the drive motor weighs approximately 2700 lb. more. The scrubber rotates at 19 r.p.m. When this type of scrubber is mounted so high in a steel structure one might expect considerable vibration due to the tumbling action of the load in the machine, but as installed at the Orange County plant, the amount of vibration is practically nil. The operation was inspected several months after the scrubber went into operation—sufficient time for any ill effects from vibrations to become evident.

Eight-Decked Structure

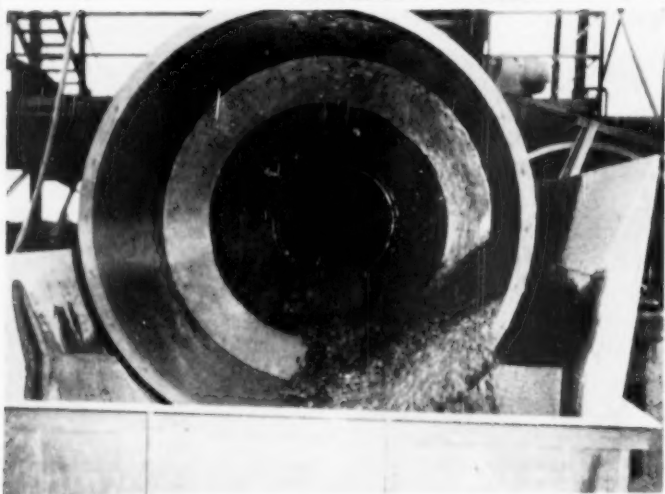
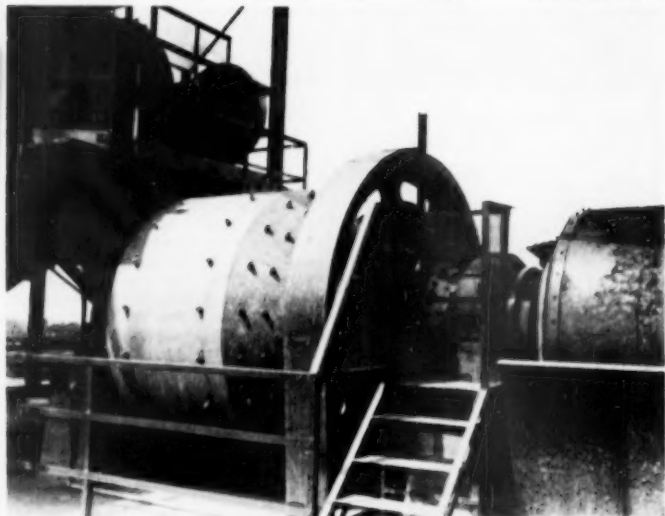
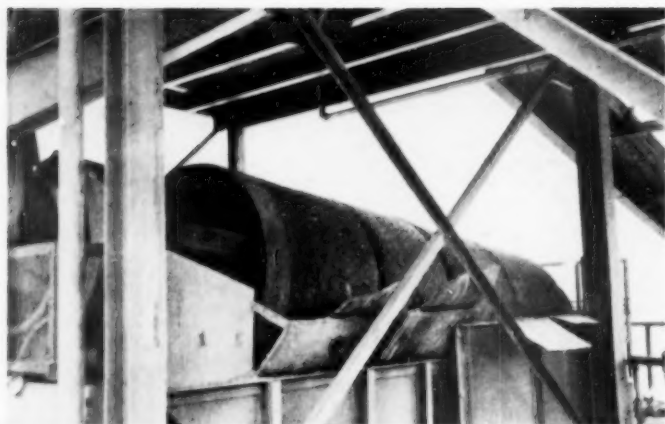
The main steel structure in the new washing plant has eight decks, counting the ground line as deck No. 1. It has an overall height of 102 ft. 3 in. The main supporting steel columns are 8- x 8-in. I-beams and are spaced as shown in the accompanying line cuts.

Floor Construction

The floor area under and immediately around the scrubber consists of an 8-in. slab of reinforced concrete. This concrete slab rests upon steel I-beams. The beams that are parallel to the long axis of the scrubber are 18 in. and those at right angles to the scrubber are 20 in. The 18-in. beams rest essentially on the web of the larger I-beam, with the entire assembly over the steel columns that are 17 ft. center to center for both plan dimensions. At the outboard or discharge end of the scrubber the concrete slab extends an additional five to six ft., with this over-



Looking down on new washing plant. Belt conveyor delivers minus 1½-in. crushed rock plus gravel. Note "bull" screen at toe of conveyor.



hanging section supported by offset steel beams, as shown in the illustration. The outboard bearings of the scrubber are supported on concrete piers which are almost over the center line of the I-beam at that end. The concrete pier supporting the feed-end bearing is inside the end I-beam and therefore is supported mainly from the slab section. Feed to the scrubber is through a steel gravity spout. The concrete slab, as will be seen from the above, is approximately 17 x 23 ft. The main steel structure for the entire washing plant is 36-ft. 6-in. wide and 70-ft. long, making quite a tall building, considering its relatively small floor area. As mentioned, there is little or no vibration in the structure.

Plant Capacity

The capacity of the plant (total) is in the 200 to 250 t.p.h. range, the amount of clay in the raw material having some bearing on the plant's output. About 50 percent of this total goes to the washing plant. Ahead of and above the scrubber is provided a 4- x 16-ft. Allis-Chalmers revolving primary scrubber screen. Here the sand and some of the clay is removed so that the Hardinge unit is receiving 30 to 33 percent of the total material going into the entire plant. Sufficient water is added to the scrubber to maintain optimum washing and scrubbing conditions with water supplied from a Layne & Bowler deep well pump delivering 800 g.p.m.

Revolving Scrubber Screen

The revolving trommel screen is mounted on deck No. 7 and has a 48-in. dia. x 10-ft. scrubber barrel and a 48-in. dia. x 6 ft. long perforated barrel with $\frac{3}{4}$ -in. perforations. A wire mesh sand sizing screen 66 in. in diameter and 10 ft. long is outside the steel barrel. This passes and sizes the washed concrete sand. The unit is driven by a 20-hp. U. S. Syncro gear motor. The screen is set at 1½ pitch and operates at 13 r.p.m.

The throughs from the trommel pass to a 48-in. x 23-ft. 3-in. Model 5-R double pitch, single spiral Wemco sand preparation machine, manufactured by the Western Machinery Co. It operates at 6 r.p.m. and is powered by a 5-hp. motor. The trommel is fed by a 24-in. inclined belt that operates at 275 f.p.m., driven by a 25-hp. General Electric built-in motor through a type 50 M. R. Pacific Gear reduction unit. The inclined belt uses 76 troughing

Top: Trommel receives minus 1½-in. material for preliminary scrubbing, removes minus ½-in. size for sand and passes oversize to scrubber. Fines go to sand preparation machine. Center: View of 8-ft. x 48-in. washer. Note concrete piers for supporting main bearings. Machine is mounted in a high steel structure but vibration is said to be practically nil. Bottom: Looking in end of scrubber gives an idea of the load carried in the washer. The end section screens out any residual minus ¼-in. material

rolls and 23 flat return rolls and operates on 258 ft. centers.

The washing plant produces No. 2 and No. 3 gravel, pea gravel and sand. The plant could produce five sizes of gravel, but at time of inspection was making only three. No. 2 gravel is minus 1½-in., No. 3 is minus 1¼-in. Pea gravel is plus ¼-in. minus ¾-in. To prepare these gravel sizes, two F-600 wet, double-deck Tyler vibrating screens are provided which are mounted back to back one above the other. These Ty-Rock screens are both 5- x 12-ft. machines and are each powered by a 10-hp. motor.

Storage Silos

The washing and screening plant is mounted above eight steel silos that have a total live capacity of 2000 tons (250 tons each). The cylinders are mounted on a heavy reinforced concrete structure so that trucks can be loaded from below. The silos are 16 ft. in diameter and 20 ft. high and each is provided with two outlet gates. Several vertical steel fins about 4 x ½ in. and 2 to 3 ft. high have been welded in each quadrant perpendicular to the long axis of the silos to strengthen the wall section of the silos. These fins are intended to offset the "skin" or the vertical drag weight of the material in the bins, for these operators have found that unless the steel in the silo's wall is unusually thick, there is apt to be a bellying out of the silo at its base-line unless additional strength is provided by the fins. Three of the silos are used for sand and the others for gravel.

The new plant was designed by the engineering staff of the Consolidated Rock Products Co. under the direction of Ronald C. Griffin, production manager, and the late Harry D. Jumper,



Minus ¼-in. material from trommel screen ahead of scrubber is received by this 48-in. x 23-ft., 3-in. spiral

chief engineer. It was built by the company.

Alongside the primary crusher a small steel rectangular bin has been provided so that trucks can return any unwanted size to the primary receiving system. A small flat belt conveyor under the rectangular bin regulates the flow and delivers this material to the primary crusher. Trucks deliver the pit-run material to a truck hopper ahead of the Farrel-Bacon jaw crusher; under this hopper is a reciprocating feeder-grizzly. In the pit a 1½-cu. yd. Marion drag line is used with a bucket made by the Daniels-Murtaugh Co., Cedar Rapids, Iowa.

Concrete Batching Plant

The operation includes a Noble batching plant for preparing ready-mixed concrete. A. W. Sanderlin is superintendent at the Orange County plant and Fred Lindeman is foreman. Robert Mitchell is president, Quintin W. Rest is vice-president and Byron Weintz is chief engineer.



Dragline used in pit operations

Safety Record Established in Lime Competition

INJURY SEVERITY during 1948 at the 42 plants enrolled in the National Lime Association safety competition was the lowest in the 14-year history of the competition, according to the Bureau of Mines, which conducts the annual survey. The injury-severity rate of 1.410 days of disability per thousand man-hours of work time in participating plants during the year contrasts with the previous record low of 2.925 for 1946. Injury-frequency rate of 24.042 disabling injuries per million man-hours was the lowest since 1937.

Winning plants in each of four groups, classified according to size and type of operation, had perfect safety records for the year. The National Lime Association will award Certificates of Honor to the 7 winning lime plants listed below:

Quarries with calcining plants working 100,000 or more man-hours—

Galloway plant, Galloway, Greene county, Mo., operated by Ash Grove Lime and Portland Cement Co., 155,163 man-hours without a lost-time injury.

Knoxville plant, Knoxville, Knox county, Tenn., operated by The Standard Lime and Stone Co., 121,520 man-hours without a lost-time injury.

Quarries with calcining plants working less than 100,000 man-hours—

Thomasville plant, Thomasville, York county, Penn., operated by The J. E. Baker Co., 92,749 man-hours without a lost-time injury.

Thomaston plant, Thomaston, Knox county, Maine, operated by Lawrence Portland Cement Co., 73,269 man-hours without a lost-time injury.

Fredrick plant, Fredrick, Fredrick county, Md., operated by Shank and Etzler Lime Co., 25,080 man-hours without a lost-time injury.

Underground mines with calcining plants—

Bakerton plant, Bakerton, Jefferson county, W. Va., operated by The Standard Lime and Stone Co., 231,945 man-hours without a lost-time injury.

Calcining plants only—

Ludington plant, Ludington, Mason county, Mich., operated by The Dow Chemical Co., 113,706 man-hours without a lost-time injury.

A total of 194 lost-time injuries, resulting in 11,277 days of disability, occurred at the competing plants in 1948. Falls of persons, handling materials (other than rock), and burns caused 40 percent of the total. Drilling and hauling accidents were the next greatest causes. Plants enrolled in the National Lime Association safety competition worked a total of 8,069,230 man-hours in 1948, the third highest exposure-time for a contest year.

Crushing Practice and Theory

Part I. Historical summary

By BROWNELL MCGREW*

THE EARLIEST U. S. patent on a crushing machine was issued in 1830. It covered a device which, in a crude way, incorporated the drop-hammer principle later used in the famous stamp mill, whose history is so intimately linked with that of the golden age of American mining. Ten years later another patent was issued, which comprised a wooden box, containing a cylindrical drum—apparently of wood also—on which a number of iron knobs, or hammers, were fastened; the expectation was that this drum, when revolved at about 350 r.p.m., would shatter the rock fed into the top of the box. This device, although it was conceived as an impact crusher and thus would rate as a forerunner of the hammermill, bore a somewhat closer resemblance to the single sledging-roll crusher. There is no evidence that either of these early inventors carried their work through to fruition.

Eli Whitney Blake invented the first successful mechanical rock breaker—the Blake jaw crusher patented in 1858. Blake adopted a mechanical principle familiar to all students of mechanics, the powerful toggle linkage. That his idea was good is attested to by the fact that the Blake-type jaw crusher is today the standard by which all jaw crushers are judged, and the leading machine of the class for heavy-duty primary crushing service.

Early Designs

The gyratory principle was the basis of several rudimentary designs, patented between 1860 and 1878, none of which embodied practical mechanical details—at least, not in the light of our present-day knowledge of the art. Then, in 1881, Philetus W. Gates was granted a patent on a machine which included in its design all of the essential features of the modern gyratory crusher. The first sale of record antedates the patent by several months, a No. 2 crusher, sold to the Buffalo Cement Co. in 1880. That was the first of several thousand gyratory crushers which carried the name of Gates to the far corners of the earth.

An interesting sidelight of these

early days occurred in 1883 at Meriden, Conn., where a contest was staged between a Blake jaw crusher and a

Gates gyratory crusher. Each machine was required to crush 9 cu. yd. of stone, the feed-size and discharge settings being similar. The Gates crusher finished its quota in 20½ minutes, the Blake crusher in 64½ minutes, which must have been a sad disappointment to the proponent of the Blake machine, who happened to be the challenger.

The Author

Old-time readers of **ROCK PRODUCTS** may recall articles by our present author, Brownell McGrew, in issues back in the early 1920's, when he was a young man. We believe he was the first writer experienced in this industry to assemble comprehensive data on crushers and the design of crushing plants. Mr. McGrew's father was a well-known quarry operator, and our author's given name "Brownell" came to him by virtue of his father's association at the time with what was then about the largest quarry operation in this country—Brownell Improvement Co., on the outskirts of Chicago. During the past quarter century or more Mr. McGrew has continued his association with the Allis-Chalmers Manufacturing Co., and has increased his knowledge and experience in the field of rock crushing and crushing plant design. We are sure even those readers old enough to remember and to have profited by his first series of articles will be interested in the present series, possibly as much as the younger generation, which has not had an opportunity to read such a survey of the field by one so eminently fitted.

— The Editors

Hand-Loaded Stone

For some years after these pioneer machines were developed, requirements, viewed in the light of present practice, were very simple. All mining and quarrying, whether underground or open-pit, was done by hand; tonnages generally were small, and product specifications simple and liberal.

In the milling of precious metal ores, stamp mills were popular as the final reduction machine. These were generally fed with an ore size that could be produced handily by one break through the small gyratory and jaw crushers which served as primary breakers. Even in large underground mining operations there was no demand for large crushers; increased tonnage requirements were met by duplicating the small units. For example, at the huge Homestake operation in 1915 there were no less than 22 small Gates gyratory crushers sizes Nos. 5 and 6 to prepare the ore for the batteries of some 2500 stamps.

Most commercial crushed-stone plants were small, and demand for small product sizes practically nonexistent. Many plants limited output to two or three products. Generally the top size was about 2½- or 3-in. ring-size; an intermediate size of about 1½ in., or thereabouts, might be made, and the dust, or screenings, removed through openings of about ¾ in. In ballast plants the job was even more simple, one split and an oversize recrush being all that was needed.

Small-Sized Plants

Many small plants consisted of one crusher, either jaw or gyratory, one elevator and one screen. Recrushing, if done, was taken care of by the same machine handling the primary break. The single crusher, when of

*Allis-Chalmers Manufacturing Co., Los Angeles, Calif., district office.

the gyratory type, might be any size from the No. 2 (6-in. opening) to the No. 6 with 12-in. opening.

Plants Grow in Output

When demand grew beyond the capabilities of one crusher, it was generally a simple matter to add a second machine to take care of the re-crushing or secondary crushing work. A popular combination, for example, consisted of a No. 6 primary and a No. 4 secondary, or possibly a 20- x 10-in., or 24- x 12-in. primary jaw, followed by one of the small gyratories. When the business outgrew the capacity of this sort of plant, it was not unusual to double up, either in the same building, or by erecting an entirely separate plant adjacent to the original one.

Crusher manufacturers were not standing still during these early years. In the gyratory line, for example, the No. 2 was the first popular size, and larger machines were developed from time to time up to the No. 6, then the No. 7 (later redesigned and called No. 7½).

Power-Shovel Loading

The steam shovel began to change the entire picture of open-pit working. With the steam shovel came the really "huge" No. 8 crusher, with its 18-in. receiving opening. Up to this time the jaw crusher had kept pace with the gyratory, both from the standpoint of receiving opening and capacity, but now the gyratory stepped into the leading position, which it held for some 15 years. Once the ice was broken, larger and larger sizes of the gyratory type were developed rapidly, relegating the once huge No. 8 machine to the status of a secondary crusher. This turn toward really large primary crushers started just a few years before the turn of the century, and in 1910 crushers with 48-in. receiving openings were being built.

Along about this time the jaw crusher suddenly came back to life and stepped out in front with a great contribution to the line of mammoth-size primary crushers: the 84 x 60-in. machine built by the Power & Mining Machinery Co. for a trap rock quarry in eastern Pennsylvania. This big crusher was followed by a No. 10 (24-in. opening) gyratory crusher for the secondary break. Interest created by this installation reawakened the industry to the possibilities of the jaw crusher as a primary breaker, and lines were brought up-to-date to parallel the already developed gyratory lines.

Tom Edison's Contribution

Although his machines never came into general use in the industry, Thomas A. Edison ranks as a pioneer

in the development of the large primary breaker; in fact, Edison is credited with the promulgation of a very interesting and constructive bit of reasoning, which was the basis of his development. Concerned at the time with the development of a deposit of lean magnetic iron ore at Edison, N. J., he was using a number of the small jaw crushers then available for his initial reduction. Realizing that to concentrate this ore at a cost to permit marketing it competitively meant cutting every possible corner, he studied the problem of mining and crushing the ore as one of the steps susceptible of improvement.

In approaching the problem, Edison reasoned that the recoverable energy in a pound of coal was approximately equal to the available energy in one pound of 50 percent dynamite; but the cost per pound of the dynamite was about 100 times that of the coal. Furthermore, a large part of the dynamite used in his mining operation was consumed in secondary breaking to reduce the ore to sizes that the small primary crushers would handle. The obvious conclusion was that it would be much cheaper to break the large pieces of ore by mechanical rather than by explosive energy.

With that thesis as a starting point, he set out to develop a large primary breaker, a development which culminated several years later in the huge and spectacular 8 x 7-ft. Edison rolls. A description of the action of this machine will be found in a later section of this series. During the early years of the present century these giant machines created considerable interest, and several were installed in this country. However, they never became popular, and interest swung back to the more versatile gyratory and jaw types. Edison rolls were also developed in smaller sizes for use as secondary and reduction crushers. In his own cement plant Edison used four sets of rolls operating in series to reduce the quarry-run rock to a size suitable for grinding.

Other Types of Primaries

During the same years wherein the industry was concerned with development of larger and still larger primary crushers, another member of the family was born: the single, sledging-roll crusher. The Allis-Chalmers Co. entered this field in 1911, building two sets of 36-in. dia. x 60-in. face single-roll crushers for the Fairmount, Ill., flux limestone plant of the Caspary Stone Co. Taking the name of its proving ground, this machine was christened the "Fairmount crusher." The machine quickly achieved a high degree of popularity, and although its field of application is relatively limited, quite a number of them were installed for primary crushing service. The line was expanded to include

smaller sizes, as well as the big 60- x 84-in. machine.

Development of concentration and cyanidation in the mining industry called for finer crushing than was feasible in the gyratory or jaw crushers then available. This requirement was met for a number of years by the double smooth-face crushing rolls, originally known as "Cornish" rolls. As the mining industry during the period we are discussing was a very active one, the development in this type of crusher had reached a fairly high stage before the end of the century, and some excellent heavy-duty rolls were available at that time. That this machine was not used to any considerable extent in the commercial crushing plants of that period was due simply to the fact that there was no demand for the smaller sizes of crushed stone, at least not any more than could be taken care of by the crushing methods then in vogue in such plants.

This brings us to the rather significant fact that, while all of the interesting and rather remarkable development we have outlined was going on, very little, if anything, was being done to develop special crushers for secondary and fine-reduction work, other than the work on crushing rolls just described.

Secondary Crushers

The use of large primary breakers made secondary crushing necessary, but this department was taken care of nicely by the existing lines of standard gyratory machines. In commercial crushed stone plants, there was gradual increase in the number of products, but generally a sufficient demand existed for the coarser grades for ballast and macadam roads to absorb the output. So for a time everything went along quite comfortably in this respect, and the operator concerned himself with the problem of getting out increased tonnage, selling his product as it was made, or stocking it during off-seasons for any particular grades.

Then came reinforced concrete, and with it a rapidly increasing demand for small sizes of crushed stone and gravel. It is hard to say when this demand began to assume sizable proportions, but shortly after 1910 commercial plants began to feel the effects of it, and to look for a remedy. For some time, as was quite logical, the remedy consisted of installing more small secondary crushers, generally small gyratories. This procedure assumed rather startling proportions in some larger plants. For example, the array of crushers in the plant of the Bussell Improvement Co., Thornton, Ill. (built in 1913) comprised one 48-in. primary, four No. 7½ secondaries and a battery of finishing crushers that included four No. 6 and twelve No. 4. All were gyratories, although later, two sets of crushing rolls were

added to augment the production of small stone.

Short-Head Gyratories

Probably the earliest attempt to adapt the standard gyratory for reduction crushing service was the short-head arrangement, which consisted simply of an abbreviated crushing head, installed in the standard machine, with concaves to match. This device did not prove to be very successful; crushing stresses were concentrated at a point where the top shell was ill fitted to withstand them, and the throw at the point of discharge was too small to take full advantage of the increased diameter of discharge opening. Chronologically, this adaption is a rather venerable one; it antedates by a number of years the more serious efforts to develop special fine-reduction crushers, a development which did not gather headway until shortly after the end of World War I.

It would be a difficult matter to ascertain just where this development had its inception; probably a great deal of parallel work was being done at the time by the various crusher builders. One of our own early experiments along these lines was the installation of special concaves in several of the No. 4 crushers in the Thornton plant mentioned above to reduce the crushing angle. The results were encouraging enough to start a more thorough investigation into the design of crushing chambers.

The disc crusher was one of the first special machines brought out for fine crushing, and for several years this new type enjoyed a wide popularity. The single toggle jaw crusher was developed in larger sizes, and because it could be operated at closer settings than similar sizes of the Blake type, found quite a field of service in small plants as a reduction crusher.

Fine Crushing

The first important development in the move to adapt the gyratory crusher to fine crushing was the debut of the Superior McCully fine-reduction crusher, which was brought out by the Power & Mining Machinery division of the Worthington Co. a few years before the Allis-Chalmers Co. took over these crushers. This machine was designed along lines identical to those of the standard Superior McCully crusher with one important exception: instead of the orthodox tapered top shell of the standard machine, the new crusher was fitted with a cylindrically bored shell, the concaves being vertical and reversible. The crushing head was flared correspondingly, this additional flare resulting, for a given size of receiving opening, in a head of much larger diameter. For example, whereas the standard crusher with 10-in. receiving opening has a head diameter of

about 27 in. at the bottom, the corresponding dimension for the 10-in. reduction crusher is about 40 in. Eccentric speeds were increased, and throws were adjusted for operation at close settings. Originally these machines were fitted with straight-face concaves; later the concaves were tapered at both ends to distribute the wear better; eventually non-choking concaves became standard equipment.

It would be difficult for us, and tedious for the reader, were we to attempt to chronicle all of the development work, some of it successful and some not, which went on in the decade following the end of the first World War. One important contribution to the art was the high-speed, direct-connected Newhouse crusher, which introduced a new principle of crushing for cleanliness and uniformity of product.

Some 20 years ago the principle of the widely flared crushing head was combined with some other new and radical departures from current practice, and the cone crusher entered the reduction crushing field. Two interesting innovations incorporated in this machine were (1) an unusually large throw and (2) a spring loaded and adjustable crushing bowl.

Special Gyratory Concaves

About the same time that the cone crusher appeared, at least three different builders applied the principle of curved-profile crushing chambers, certainly the most important and far-reaching improvement in crusher design that had been made for many years—possibly the greatest since the inception of the gyratory type. In our own case this development took the form of "non-choking" concaves, which could be installed in any of the existing models of gyratory crusher without any change in the shape of the crushing head. The type quickly became standard equipment in our reduction crushers, the Newhouse and Superior McCully fine reduction machines. But of equal importance was the fact that the efficiency of many hundreds of existing standard machines, of all ages and styles, was markedly improved at a very nominal cost by substituting these new curved concaves for the old straight-face liners.

All crushers developed up to this time, except the very large machines of the gyratory type, were provided with some means of adjustment to compensate for wear or to adjust for variations in product size. The range of adjustment in most machines was small; adjustments in most cases required shutting down the machine. In the gyratory types, after a certain amount of adjustment was made, it was necessary to reset the concaves. This did not constitute any serious drawback in primary and secondary crushing service, because wear was

slow generally and the exact setting of discharge opening was not a critical matter. With the increase in demand for fine crushing the situation altered; it was necessary to set crushers closer and to maintain the setting within closer limits. It was immediately apparent that a crusher with a large range of adjustment, without the necessity of resetting the wearing parts, would be very desirable; as a matter of fact, the first cone crushers brought out incorporated such a feature, which proved to be very popular.

Special Setting Adjustment

Our own engineers studied this problem along the lines of combining wide range with speed of adjustment. The result of this study was the introduction of the idea of supporting the mainshaft on an oil-operated hydraulic jack. This idea was first incorporated in a special model of the Newhouse crusher, designated as the "Oil-Adjusted" crusher. A few of these machines were built and tested under severe operating conditions, and the line would undoubtedly have been developed extensively had not the "quiet" period through the early 1930's effectively checked the demand for new crushers.

We had not lost sight of the possibilities of this method of adjustment, however, and when conditions showed signs of improvement we were ready to incorporate the oil adjustment feature into an entirely new machine, a machine which was to be designed in all its proportions specifically for reduction crushing, with a scientifically proportioned crushing chamber, "quick-set" adjustment, safety release for tramp-iron protection, and high speed operation for maximum capacity at close settings. This machine, the "Type R," was brought out early in 1938.

Giant Gyratories

We left the big primary gyratories back among the misty memories of the first World War. As a matter of fact, there is not a great deal more to tell so far as these machines are concerned, except for one more big jump in top size. This machine, which had reached a 48-in. receiving opening by 1910 and 54-in. shortly thereafter, was developed a few years later into the 60-in. size.

Our own first 60-in. machines were built in 1926-27, and these crushers—two of which were installed in a South American copper mine—set a world record in weight and proportions which still stands. These giant machines, weighing about 500 tons each, and rearing their steel frames to the height of a two-story building, are indeed a long step forward from the first tiny No. 2 Gates crusher that came out of the little shop on Randolph Street in Chicago some 60 odd years ago.

(To be continued)

Manufacturing Cement in Vertical Shaft Kiln

A SMALL dry-process plant, owned and managed by the Cementwerke Darlingen A. G., Berne, Switzerland, operates a vertical shaft kiln with profitable results, in spite of the rejection of this type of kiln in America and Great Britain. The plant was built in 1920 and is situated in Darlingen, on the shores of Lake Thun in the Bernese Oberland, and employs some 50 men.

Yearly output of cement is 3500 carloads, which amounts to 35,000 tons, and is shipped by truck or rail at 70 francs per ton. The cement is used for all purposes, including hydroelectric projects. It is difficult to assess the quality by American standards due to differences in methods of testing for strength. Specimens are tested in flexure, and the broken ends are then subjected to compression tests. A 28-day specimen showed 76 kg./sq. cm. in flexure and 462 kg./sq. cm. in compression.

Consumption of electricity is about 2000 units per day, purchased at 5c per unit. The coke and anthracite required for the kiln are obtained from

By G. H. ROBINSON*

England and America at a cost of 120 francs per ton.

Two Quarries Used

There are two quarries close to the works from which the high and low calcium limestones are conveyed by aerial tramway to the crushers, which discharge into storage bins. The following chemical analysis indicates the quality of the raw material:

Material	Percent
Calcium carbonate	78
Silica	13.4
Alumina	4.78
Ferric oxide	2.92
Lime	43.4
Sulfuric anhydride	0.44
Magnesia	1.22

The stone is again crushed before passing through a rotary dryer. Grinding of the dry raw material is carried out in a conventional ball mill. One percent of pyrites is fed into the mill at the same time to assist combustion in the kiln. Discharge from the mill passes into separate raw mix silos according to its lime content, and the blending is accomplished by means

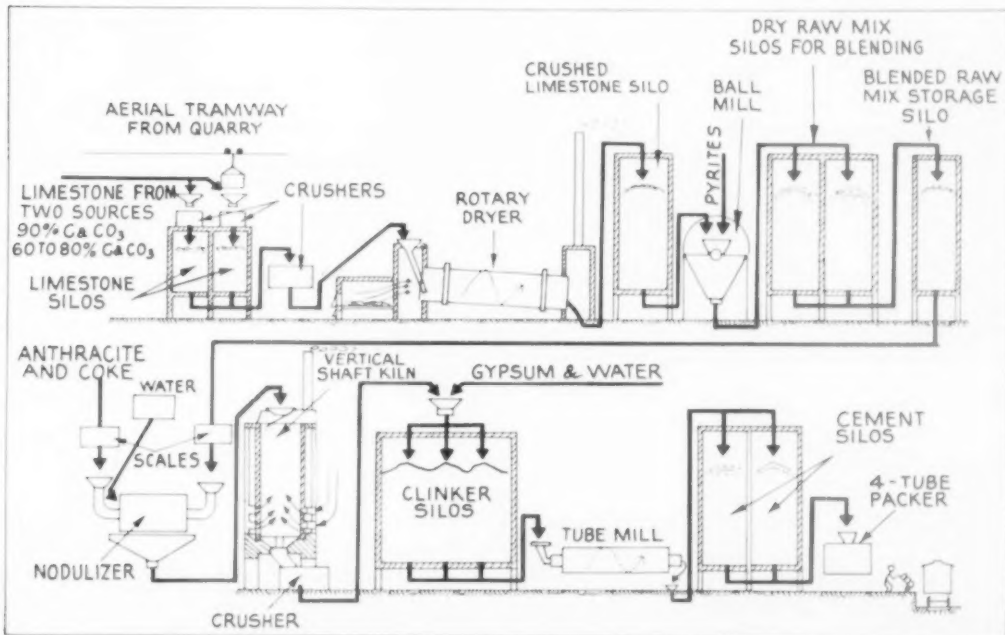
of conveyors and elevators. The corrected mix is conveyed to a separate silo reserved for kiln feed, and is then discharged into a nodulizer with measured quantities of anthracite screenings, coke breeze and 10 to 12 percent of water.

Vertical Kiln Operation

The dampened mix, in nodule form, is then distributed mechanically at the top of the Andreas (vertical) kiln. (This type of kiln was first produced in 1928. It is fitted with an electrostatic dust precipitator. The operators claim a low fuel consumption of low grade fuel and moderate dust losses. Installation costs are small compared with rotary kilns and very little ground area is required.)

Clinker, discharged from the kiln, is crushed and proportioned with gypsum and water before passing into storage. Finish grinding is done in a three-compartment tube mill. Packing is carried out at the rate of 40 t.p.h. on a Haver and Boecker "Modern" four-tube packer, using paper sacks.

M. Ziegler is director of the company and M. Weibel is works manager through whom permission to publish these facts was obtained.



Flowsheet of Swiss cement plant operating vertical shaft kiln

Thermodynamics of Lime Manufacture

PART II. Economics of fuels for rotary kiln operation, the combustion process, and the various factors influencing efficient operation are presented with reference to the design of rotary kilns

By RALPH GIBBS*

IN THE TYPE of rotary kiln usually operated, there are two major factors limiting the development and transfer of heat. These are (a) the pressure drop through the kiln, and (b) the physical dimensions of the kiln.

Ordinarily the pressure drop through the kiln is measured by the draft at the feed end of the counter-flow kiln. The author considers it more desirable to use the term "pressure drop" rather than "draft" since it is not inconceivable that the time may come when the gases will be forced through the kiln by a positive pressure above atmospheric. The "draft" simply measures the partial vacuum that is drawing or sucking the gases through the kiln. At the present time it is the common practice to have atmospheric pressure at the discharge end of the kiln and a partial vacuum at the feed end, the sub-atmospheric pressure maintained either by a column of hot gas in a chimney or by mechanical blowers. In any event, the pressure drop through the kiln is one of the factors limiting the rate at which the fuel can be properly burned.

Fuel Economics

The heat used in rotary kilns generally is developed by the combustion of some primary fuel such as coal, oil or gas. On the basis of the potential heat units delivered to the kiln, coal (a good grade of bituminous) often is the cheapest and therefore most generally used. With coal at \$6 per ton delivered to the kiln, the cost of 1,000,000 B.t.u. is about 22¢. With bunker C (No. 6) oil delivered to the kiln at 5¢ per gal., the cost of 1,000,000 B.t.u. is about 42¢. With gas delivered to the kiln at 5¢ per therm, the cost of 1,000,000 B.t.u. will be about 50¢.

Under certain conditions there may be some advantage in using the fuel of higher cost. The fear that coal ash will contaminate the charge to an unfavorable degree has been the deciding factor, in many instances, where oil or gas has been selected. On the other hand, when the coal is prepared properly, and when the velocities of the gases through the kiln are

adequate, the contamination by ash is not at all serious.

In order to make this study apply as broadly as possible, coal and oil will be discussed independently so that the differences in applying them will be shown. Because of the different chemical and thermodynamic properties of the different fuels, the derivations postulated upon the use of one fuel are not always directly applicable to the other.

Cool as Fuel

When we speak of coal in connection with rotary kiln operations, a good grade of bituminous coal is implied. Such a coal will have an ash content of about 6 percent and a heating value of about 13,500 B.t.u. per lb.

Although a great deal has been said and written on the economic importance of carrying on the combustion process at its greatest possible efficiency, it might be worth while to review some of these fundamentals.

When coal is burned with insufficient air for complete combustion, the full heating value is not released for direct use. Under these conditions, only a portion of the potential heat is

made directly available. The remainder exists only as potential heat. Each pound of carbon, when burned completely to carbon dioxide, develops 14,092 B.t.u. Each pound of carbon burned to carbon monoxide develops only 3843 B.t.u. In the latter case, 10,250 B.t.u. remain as potential heat in the carbon monoxide. And when carbon is so burned, only 2.2 percent of the original heat potential is available at the point or place where this chemical action is taking place.

On the other hand, air in great excess is to be avoided also since this causes the heat to be released at a lower temperature level, the gas velocities in the furnace or kiln must be increased to handle the same quantity of fuel, and the heat carried to waste by the gases will be increased, all other conditions remaining constant.

As an illustration of how excess air affects the theoretical flame temperature, the following computations, tables and graphs are presented.

The theoretical flame temperature is computed by using the following relation:

$$T_f = \frac{H}{W_s \times C_s}$$

where T_f is the theoretical flame temperature in deg. F.

H is the heat of combustion of

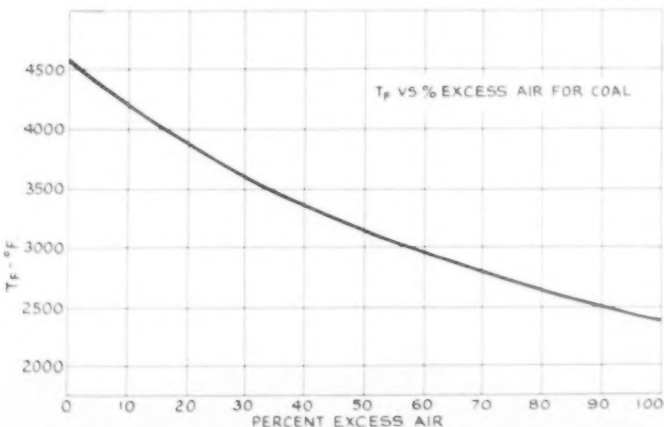


Fig. 1. Graph showing effect of excess air on theoretical flame temperature in burning coal

*Consulting Engineer, York, Penn.

the fuel. For the coal postulated, this is 13,500 B.t.u./lb.

W_p is the weight of combustion products per pound of fuel.

C_p is the specific heat of the gases of combustion, an average of about .27 for the temperatures involved.

The weight of combustion products depends upon the air-fuel ratio. With the coal as it has been postulated, the optimum air-fuel ratio for balanced combustion is about 10 lb. of air for each pound of coal. Each pound of coal carries with it about 6 percent ash, so that 94 percent will be largely converted into gas in the combustion process. Thus, for the optimum air-fuel ratio:

$$W_p = .96 \text{ plus } 10.0 = 10.96$$

so that:

$$T_p = \frac{13,500}{10.96 \times .27} = 4560 \text{ deg. F.}$$

And when the air-fuel ratio is 11, then:

$$T_p = \frac{13,500}{11.96 \times .27} = 4180 \text{ deg. F.}$$

Table I shows the effects of excess air on the theoretical flame temperature up to 100 percent of theoretical air for complete combustion. The graph in Fig. 1 shows these relations pictorially.

There are those who may not approve the use of these theoretical flame temperatures in the computations to which they will be applied subsequently. On the other hand, although such temperatures are not attained actually due to the immediate radiation of heat and to the dissociation of some of the gases at these high temperatures, we are interested primarily only in the equivalent heat involved. And for this purpose the use of these flame temperatures is valid and most convenient in simplifying the problem.

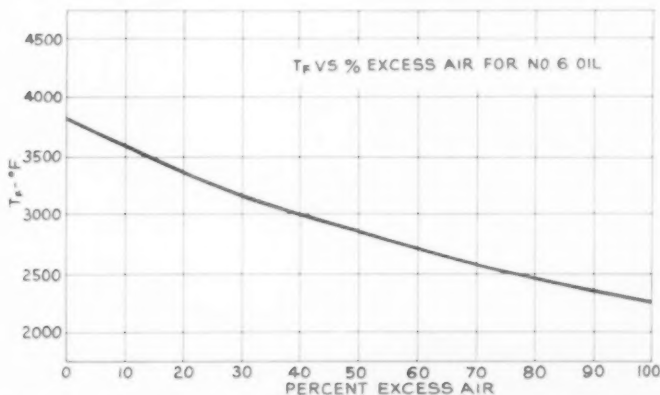


Figure 2: Graph showing effect of excess air on theoretical flame temperature in burning Bunker C No. 6 oil

Lb. air per lb. of coal	Percent excess air	W_p	T_p Deg. F.
10	0	10.96	4560
11	10	11.96	4180
12	20	12.96	3860
13	30	13.96	3590
14	40	14.96	3340
15	50	15.96	3130
16	60	16.96	2960
17	70	17.96	2790
18	80	18.96	2640
19	90	19.96	2510
20	100	20.96	2390

Table I: Effect of excess air on theoretical flame temperature in burning coal

Lb. of air per lb. of oil	Percent excess air	W_p	T_p Deg. F.
14.25	0	15.25	3920
15.60	10	16.60	3590
17.05	20	18.05	3300
18.45	30	19.45	3100
19.85	40	20.85	2900
21.30	50	22.30	2740
22.70	60	23.70	2600
24.15	70	25.15	2470
25.60	80	26.60	2360
27.00	90	27.00	2260
28.50	100	28.50	2180

Table II: Effect of excess air on theoretical flame temperature in burning Bunker C No. 6 oil

In any event, to get the most economical results from the combustion process in the development of heat, the combustion of the fuel must be carried through at its highest possible thermal efficiency near the maximum temperature possible. With insufficient air, the full development of the potential heat into an immediately usable form isn't accomplished. With excessive air, the full heating value is developed in the reaction, but this takes place at a lower temperature level. It will be recalled from the previous article (Rock Products, February, 1950, p. 118) that the temperature level is of the greatest importance when burning lime or dead-burning dolomite.

The use of enriched air recently has been tested in some steel plants with amazing results. By adding oxygen to the air for combustion, that industry has been enabled to reduce the time required to process the "heat," and

to do this at a thermal efficiency higher than when using air alone. The application of this innovation to rotary kiln processing awaits further analysis and investigation.

Oil as Fuel

With regards to the combustion process itself, all that has been said for coal can be said also for oil. The principles remain identical. Because of the different nature of oil as a fuel, however, there will be a difference in the values of the weight of gases involved and a corresponding difference in the theoretical flame temperature.

Bunker C, or No. 6 oil as it is frequently termed, is composed of about 88 percent carbon and 12 percent hydrogen. It weighs nearly 8 lb. per gal. and has a heating value of nearly 18,870 B.t.u./lb. The theoretical quantity of air for balanced combustion is 14.25 lb. per lb. of oil. With this information on the fuel, Table II and Fig. 2 illustrate the variation in the items as was done for coal.

Rotary Kiln Dimensions

Although the combustion process actually consists of a series of innumerable miniature explosions, it can, for all practical purposes, be considered continuous. There is a constant flow of air and fuel into the zone of action. Also, there must be a correspondingly constant flow away from the combustion zone. The rate of this movement is extremely important. This rate of flow has a great effect on the rate at which the fuel must be supplied to enable its combustion to take place efficiently. It also affects the rate at which the flowing gases give up their heat to the material being processed in the kiln.

In practically all cases of rotary kiln operation, the combustion process is a volume phenomenon, while

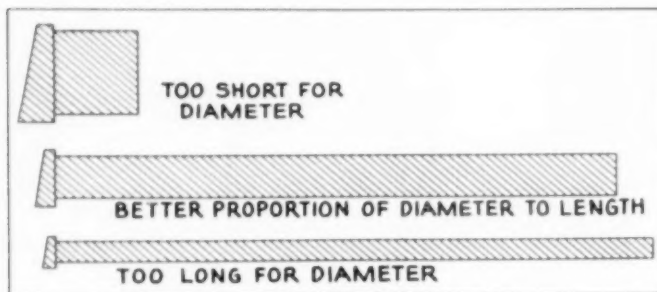


Fig. 3: Optimum proportions of kiln length to diameter

heat transfer largely is a surface phenomenon. In the rotary kiln, then, the object is to provide adequate volume and surface for processing the material at the desired rate. Furthermore, the surface and volume must be proportioned properly.

It is easy to see how it is possible to provide ample volume for combustion, but, at the same time, have insufficient surface for the transmission of the heat developed. Also, it is just as easy to see that it is possible to design the kiln so that the volume for combustion is inadequate for the surface available to the transfer of heat. When the proportion of the combustion volume to the heat transfer surface is too great, the system will be wasteful with fuel. When the proportion of heat transfer surface to combustion volume is too great, then the first cost of the kiln, and the carrying costs of the additional investment, are too high. In other words, there will be some optimum balance or ratio between the volume and surface at which the over-all manufacturing cost of the material produced will be a minimum. Fig. 3 presents these statements in graphic form.

Kiln Design

For this study of the relations found to be naturally inherent with the geometric form termed the cylinder, the over-all physical dimensions of the kiln shell will be used. Here, again, there will be some who will voice objection; this course is valid nevertheless. When these dimensions are used as the basis for deriving the coefficients sought, then these coefficients are applicable to use in the general computations.

The rotary kiln shell is substantially a cylinder, or a series of cylinders, the diameters of which may be different, joined end to end. For our present purpose, and to simplify the illustration, cylinders having one diameter throughout their length will be used.

The properties of the true cylinder are extremely interesting. The basic ones are:

$$A_1 = \text{cross-sectional area} = \frac{\pi D^2}{4}$$

$$A_2 = \text{cylindrical surface area} = \pi D L$$

$$V = \text{cylinder volume} = \frac{\pi D^2 L}{4}$$

where D is the diameter, L is the length, and π is the ratio of the circumference to the diameter, numerically approximated by 3.14.

For cylinders of equal length but of different diameter the ratio of A_2 to V is:

$$\frac{A_2}{V} = \frac{\pi D L}{\frac{\pi D^2 L}{4}} = \frac{4}{D}$$

This relation tells us that, for any cylinders of equal length, the ratio of

Diameter of cylinder—Feet	Square feet of cylindrical surface per cubic foot of cylinder volume
4	1.000
5	.800
6	.667
7	.571
8	.500
9	.443
10	.400
11	.364
12	.333

Table III: Change of kiln surface with change in diameter

the cylindrical surface area to the volume decreases as the diameter in-

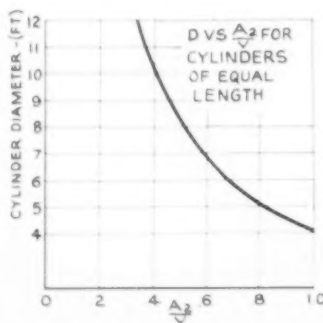


Fig. 4: Effect of diameter upon cylinder surface area

creases. In other words, for cylinders of equal length, the square feet of cylindrical surface per cubic foot of volume decreases as the diameter increases. This peculiarity of the cylinder is illustrated in the table and graph below.

Thus it can be understood that the effects of a volume phenomenon on a surface phenomenon, within a zone of fixed length, will be intensified with an increase in the diameter. When the diameter is doubled, it may be assumed that the volume effect on the surface will be doubled, or nearly so. Later, as we get into it, this will help to explain why a properly proportioned kiln twice the diameter of another will produce about eight times as much product with only four times the surface. By doubling the diameter, the effectiveness of the heat transfer surface is doubled. The cumulative effects result in a productive capacity about eight times as great.

The larger kiln produces a ton of lime with less surface available than the smaller kiln. And since the first cost of the kiln can be measured more nearly, probably, by its surface rather than its volume, it is highly desirable to have the kiln diameter as large as possible for the production rate desired. No doubt it would prove to be far more economical to install one properly proportioned 10- or 12-ft. dia. kiln rather than to install eight properly proportioned 6-ft. dia. kilns to produce the same quantity of material. Unless there is a severe factor demanding a wide variation in the productive capacity of the plant, or unless the plant demand exceeds practical kiln sizes, the large units will be more economical than the smaller, and should be used.

Air-Entraining Cement in Plaster

ACCORDING to an article in *Plastering Industries*, February, 1950, experiments are contemplated to develop the use of air-entraining cement in the field of plaster and stucco. The article states "shrinkage might be greatly reduced or eliminated through the use of this material because air-entrained stucco and plaster would be more cohesive and thus would require no other plasticizing agent."

Blast Furnace Slag in Mines

BLAST FURNACE SLAG, according to *Mining Engineering* magazine, January, 1950, is reduced to 12-16 mesh and is being used for sanding track at the Mont coal mines of Arco Steel Corp., Middletown, Ohio. The article states it has proved so effective and economical that tests are being made to use the slag for road dusting as well.

EXCAVATING SAND BY PERFORATED BUCKET

Commonwealth Sand & Gravel Co., Richmond, Va., has had successful experience with the use of a perforated-type dragline bucket to reclaim sand from settling pond

IT IS OFTEN THOUGHT that the use of perforated-type dragline buckets results in the loss of a considerable amount of material through the perforations, which material then has to be rehandled. Commonwealth Sand & Gravel Co., near Richmond, Va., employs this type of bucket at its plant, principally for underwater digging, and, according to Lewis W. Troutman, plant manager, the above possibility was never given a second consideration.

The sand recovery system at the plant is a very simple but effective one. Minus $\frac{1}{4}$ -in. material flows to an elongated pool, approximately 75 ft. long by 20 ft. wide near the plant. Sand pulp flows in at one end and the effluent waters flow out the opposite end. The concrete sand settles in the upper or feed end of the pit, and the masons sand settles at the outlet end. This system of sand recovery was the final choice of several methods tried and has worked out most satisfactorily. The sands produced in this manner have the proper amount of 200-

mesh material to meet the required specifications. A 604 Koehring dragline with a 65-ft. boom and $1\frac{1}{2}$ -cu. yd. Hendrix perforated bucket operates from the rim of the pool. The Hendrix perforated bucket is made by



Upended bucket sinks into material



Unit, rear, is used for stripping, while dragline, center, recovers gravel



Lewis W. Troutman, plant manager

the De Soto Foundries Inc., Mansfield, La.

Operating conditions were such at this pool at time of inspection to give an ideal opportunity to observe and photograph the perforated bucket in action. According to Mr. Troutman "the Hendrix buckets are the best diggers that we have found for our purpose."

The dragline previously referred to digs the concrete sand out of the pit and dumps it to piles alongside the rim. Then the unit moves to the other end of the pool and digs masons sand. All the sand dug is below water line and had not been in the pool long enough to be thoroughly settled and compacted. Thus, it would appear that if there were going to be any loss of material through the perforations, it would show up here. Inspection showed that the bucket would drop into the pool in an almost vertical position and in a second or less would sink until about half submerged. With a pull on the dragline the bucket was practically full before it started to up-end on the way out of the pit. Pass after pass was made and at each operation there would not be over two handfuls of sand squeezed out of the perforations. The only thing that left the bucket was water and it seemed to sift out through the interstices of the sand.

At the pit, some 3000 ft. from the plant, 1 to 10 ft. of earth strippings overlay gravel that is up to 35 ft. deep. There is a small amount of 8- to 10-in. gravel in the deposit, but it has a high sand content. For every 1000 tons of gravel produced, 600 tons of sand are sold or stockpiled. A Marion 362 with a $1\frac{1}{2}$ -cu. yd. perforated bucket is used for stripping. For digging the gravel a Northwest Model 8 with a 2-cu. yd. perforated bucket is used. The operators were

(Continued on page 145)

REDUCTION OF SAND SIZES IN STOCKPILES

Research indicates that fineness modulus of sands stored in stockpiles will vary because of loss in particle sizes with time; theory is advanced that sand size loss may be a contributory factor to decrease of mortar strength in course of time

By ERNST W. GREINER

EXPERIENCES of numerous kinds over a term of years developed the idea quite a while ago that the grading of sand, whether natural or manufactured, does not remain constant with the lapse of time. For instance, it was observed that piles of sand apparently became finer between time of stocking and time of shipping—say, six months or more. Because of the number and nature of the samples taken, both during the building of the piles and the exhaustion thereof by shipment, the discrepancies seemed not to be chargeable to unrepresentative sampling. Cross-sectional samples, taken of the flow from the chutes in both cases and samples taken in various ways from the piles, left no doubt that something had happened to the sand during the stocked period to decrease the proportion of the coarse size or sizes and increase the proportion of the minus 100-mesh size. Variations in the percentages of the intermediate sizes (occurring between stocking time and shipping time) either discredited the sampling and sifting practices or pointed to the need for hunting for a rational explanation. Of course, to sand producers and sand users the variations noticed were of no consequence because compliance with specifications was not affected; that is, the stocking and shipping samples both contained the amounts of sieve sizes re-

quired as a minimum or permitted as a maximum in the specifications.

Also, in the case of samples stored for future use or reference, after the lapse of some months (the samples being kept dry) a finer grading was obtained on the unsifted remaining half of an original sample than had been obtained on the half subjected to sieve test months before. Confirmation of this last condition was found in the resifting, after several months, of samples that had at the time of the original sieve test been recombined. The later tests gave finer gradings than the earlier. Both individually and by the average of groups of sizes it was found that the percentage of the coarsest portion was, after the lapse of some months, noticeably lower, and that of the finest portion noticeably higher, than at the beginning. The in-between sizes showed some changes, but within limits that called for some other explanation than manipulative variations in handling the screens.

Arithmetic Losses and Gains

These observations on both natural and manufactured sands indicated that there were arithmetic losses and gains (determined by increment from

above and decrement from below) in the portions of successive sizes, depending on something that had nothing to do with the physical condition of the screens or the mechanics of the sifting operation. A specific sieve size, say, plus 14-mesh minus 10-mesh gained something from the size above and lost something to the size below. When these two differed in amount the resultant percentage of plus 14-mesh minus 10-mesh was higher or lower accordingly than it had been at the time of the earlier sifting. For further study, samples of sand of different kinds of material were carefully sifted and stored. On resifting, sometime later, variations in grading percentages similar to those described above were obtained. These variations resulted with sand that, after the initial screening and remixing, had remained for some months untouched, unhandled, free from any movement, and not subjected to any changes in temperature or humidity of the ambient atmosphere other than those going with normal office or workroom conditions.

More specifically, there seemed to be reason to think that a given weight of any particular size—say, plus 14-mesh minus 10-mesh—in the course of time would consist of material of less than this size, with some plus 20-mesh minus 14-mesh and some minus 20-mesh. Preliminary investigations indicated that the losses were not of equal amounts in weight or percentages for all sizes and were different also for various materials.

Strength Variations

The foregoing observations seemed at first to be curious, rather than significant, items of information. After a time the large number of grains affected, and the presence and persistence of this feature in all the sands tested, suggested the idea that this phenomenon might be related to the well known phenomenon of mortar briquettes or cylinders, and even of concrete, reaching a maximum strength and then, perhaps after a stationary period, showing some weakening. The increase in strength is in theory related to the reactions involving changes in the cement. But at the point where the decrease in strength begins, the explanations be-

ITEM NO.	SIEVE SIZE OF PORTION		PERCENTAGE OF LOSS: PERCENTAGE OF EACH ITEM PASSING THROUGH THE "ON" SIEVE AND STAYING ON THE NEXT LOWER SIEVE, AFTER SIX MONTHS OR MORE		
	THROUGH	ON	SAND "A"	SAND "B"	SAND "C"
1	NO. 6	NO. 8	12.5	9.7	15.9
2	NO. 8	NO. 10	*	9.8	11.4
3	NO. 10	NO. 14	11.4	4.2	13.6
4	NO. 14	NO. 20	3.5	8.1	12.8
5	NO. 20	NO. 28	4.2	5.7	15.1
6	NO. 28	NO. 35	5.1	16.6	30.5
7	NO. 35	NO. 48	5.7	12.2	9.0
8	NO. 48	NO. 60	8.6	9.4	30.3
9	NO. 60	NO. 80	16.5	23.9	66.2
10	NO. 80	NO. 100	15.9	7.3	11.0
11	NO. 100	NO. 150	5.6	8.7	*
12	NO. 150	NO. 200	14.7	14.6	13.2

* NOT DETERMINED

Table 1. Percentage of loss from each of twelve consecutive sieve-sizes of sand to the next lower sieve-size after lapse of six months or more

SAND SIZES

come hazy. The intervening of a stationary period, of whatever length, merely delays the application of some new assumption that must be made to explain the subsequent decrease in compressive strength.

Sand Grain Breakage

Not as a full explanation, nor as more than a partial cause of the phenomenon of decrease of strength in cement mortar in course of time, there is advanced the theory that a partial chipping, flaking or scaling of the sand particles may play a part in the receding phase of the strength tests. As a contributory cause it would seem to deserve investigation under conditions of such control that its direct effect could be established apart from other known or supposed intra-mass actions.

As a source of mortar weakness, even if it may be considered minor, after the normal strength-producing processes have exhausted themselves, the possibility of sand-grain breakage cannot be disregarded. It is evident that when a part of the body of a grain of sand has split itself from the grain, an incipient cleavage has been started for the mass of which the grain is a part. A slip surface has been formed along which there is no resistance to pull or push, that is, to tension or compression. With the occurrence of a considerable number of such fractures, it is inevitable that the slip surfaces will be adverse to the retention of the strength produced by the normal hardening processes of the cement-sand mixture.

Table I shows just what quantities of broken sand particles are under discussion. The table gives the loss from each of twelve closely screened sizes to the size next smaller. The record is for three different kinds of sand designated "A," "B" and "C," and the elapsed time from the original screening to the screening determining the loss is six months or more. To avoid the difficulties of reading a complicated table, the losses given are not total losses, but only the loss to the next smaller size. That is enough to establish the point to be made. For instance, the loss from Item 3 to Item 4 in the case of sand "A" is 11.4 percent, a value that has nothing to do with any smaller-sized material produced that went through the No. 20 sieve of Item 3. So also, the loss of 3.5 percent from Item 4 to Item 5 has nothing to do with the loss previously referred to because the loss from Item 3 was not physically added to the mass of Item 4 at any time. Though the total loss from Item 3 included some material of the size corresponding to the size of Item 5, that portion of the loss does not appear in Table I.

The portions separated at the initial sifting were put into separate containers which were code marked and set aside for the later sieve tests by which the respective losses, if any,

COL 1	COL 2	COL 3	COL 4	COL 5	COL 6	COL 7	COL 8
ITEM NO.	SIEVE-SIZE OF ORIGINAL PORTION AS SCREENED AND STORED	SAND DESIGNATION	PERCENTAGE OF LOSS FROM ORIGINAL PORTION (LONG THROUGH SIEVE OF COL 2) AFTER FIRST STORAGE PERIOD OF 4 MO FOR "E" 6 MO FOR "E"	PERCENTAGE OF LOSS FROM REMAINDER OF ORIGINAL PORTION (ORIGINAL PORTION - COL 4 AND COL 5) AFTER SECOND STORAGE PERIOD OF 4 MO FOR "D", 3 MO FOR "E"	PERCENTAGE OF LOSS FROM REMAINDER OF ORIGINAL PORTION (ORIGINAL PORTION - COL 4 AND COL 5) AFTER SECOND STORAGE PERIOD OF 4 MO FOR "D", 3 MO FOR "E"	PERCENTAGE OF LOSS FROM REMAINDER OF ORIGINAL PORTION (ORIGINAL PORTION - COL 4 AND COL 5) AFTER SECOND STORAGE PERIOD OF 4 MO FOR "D", 3 MO FOR "E"	PERCENTAGE OF LOSS FROM REMAINDER OF ORIGINAL PORTION (ORIGINAL PORTION - COL 4 AND COL 5) AFTER SECOND STORAGE PERIOD OF 4 MO FOR "D", 3 MO FOR "E"
	THROUGH	ON	TO "ON" SIEVE NEXT BELOW	THROUGH "ON" SIEVE NEXT BELOW	TO "ON" SIEVE NEXT BELOW	THROUGH "ON" SIEVE NEXT BELOW	TO "ON" SIEVE NEXT BELOW
1	10	14	D 6.08	0.11	8.71	0.36	
2			E 5.75	0.10	6.61	0.11	
3	14	20	D 7.87	0.12	4.81	0.27	
4			E 8.36	0.10	6.69	0.22	
5	20	28	D 3.30	0.45	4.48	0.47	
6			E 8.73	0.38	5.14	0.36	
7	28	35	D 4.96	0.38	10.81	0.40	
8			E 19.02	0.32	4.87	0.19	
9	35	48	D 9.13	0.42	10.33	0.47	
10			E 5.61	0.35	5.97	0.09	
11	48	60	D 5.10	0.68	47.10	0.08	
12			E 32.00	0.42	17.92	0.63	
13	60	80	D 9.41	0.12	15.79	0.13	
14			E 31.18	0.82	38.47	0.68	
15	80	100	D 8.81	0.10	14.77	0.56	
16			E 33.51	0.18	6.79	0.54	
17	100	200	D 9.56		4.37		
18			E 7.17		12.87		

Table II. Comparison, after lapse of two consecutive periods of rest, of the percentage of loss, from each of nine consecutive sieve-sizes of two sands, to the next lower sieve-size.

were to be determined. No separated portions were at any time combined again.

A glance at the values of Table I will possibly create the impression that were the components of the original volume remixed along with their subsequent derivatives, the original grading might not be modified much, except that the coarsest size would be lower in percentage and the finest size would be higher. In between, the gains and losses would tend to offset each other and leave the original figures with no great changes. These slight total changes in the grading figures would be deceptive for determining just what has happened with the individual grains of sand. It is the amount of the loss from each size, both absolute and percentage-wise, that gives an idea what breakage, or formation of uncemented faces, has occurred in the grains of sand originally belonging to the sized portion. By keeping the sifted portions separate, each original sieve-sized portion is seen to have a loss by whatever part of it goes through the bottom sieve on which all of the designated size stayed at the previous sifting period. The gain, by whatever amount the size has received from the sieve above, might nearly or quite balance the loss to the size below. In some cases these two do not balance at all. For instance, material "C" in Item 8 would have received the loss of 9.0 percent of Item 7 but would have lost 30.3 percent of itself to Item 9. No matter what the absolute amounts thus received and lost may be, the important and significant fact is that while some size may lose a small percentage of itself by this flaking or scaling process, the size above or below may lose two, three or as high as six times that percentage of itself.

Nature of Breakage

What is the nature of the breakage here under discussion? The subsequent resifting of the sized portions indicates that the cause of the reduction in grain size is not of such gross nature as a sand grain splitting into two, three or four larger pieces accompanied by normally graded particles of dust. Were it so, this might result in a new gradation series similar to the mother mass of which the portions were the components. Rather, such minute specks become released from any one grain as will permit that grain just to pass through a hole it had previously stayed on. The specks are mostly of dust size and contribute, accordingly, mostly to the volume of the minus 100-mesh size. By weight more than 90 percent of the reduced grains will be reduced only enough to stay on the next smaller-sized sieve. The balance is not distributed to the successively smaller sizes in the same way as is done when such material is crushed. Most of the balance will be found in the "dust" portion of the sieve—below 100 mesh. This chip or scale-shedding process by which a sand grain becomes reduced is more like an abrading than a crushing action; the reduction in grain size is not by shattering, but by chipping or scaling off of surface specks.

The scaling, chipping or flaking process by which particles spring off of grains of sand, the grains thereby losing some of their dimensions and weight, is not confined to age or kind of sand—new or old sand, whether natural or manufactured. Natural sand was "manufactured" by nature ages ago—but it does just what newly crushed sand does. While the shape of crusher-made sand grains may have something to do with the spring-

ing off of sharp edges, natural sand, consisting mostly of rounded grains, is not immune to the size and mass diminishing action.

The designations of the sands as "A," "B," "C" in Table I and "D," "E" in Table II have been used to avoid a diversion of the discussion or data from the commercially neutral purpose of this article. The specimen lots selected for these tables consist of both "natural" and "manufactured" sands (the order in the tables, however, being determined by lot), all of different materials, and from widely separated locations of origin. The samples speak for themselves, but can not with certainty be considered typical enough of like material to warrant general deductions of the merits of such material in regard to their ultimate stability in mortar. Another difference which prevents cross comparisons is that the time periods are not all the same. The important feature of the tables is that the individual sizes of sand of five different materials show enough breakage during rest periods of half a year or more to take the harmful effects of this phenomenon on mortar out of the realm of mere speculation.

Preparation of Material

In the preparation of the original mass of each sand material the whole commercial sample was washed, dried free from surface moisture, and screened. Each sized portion was carefully sifted to practical refusal. The sized portions were then weighed, put into containers and set aside on a shelf where they were left undisturbed till the next sifting period. Some monitor samples were used as guides in determining how long the determinative samples should be allowed to rest before being resifted.

Numerous precautions were taken in regard to the condition of the sieves and the method of sifting to ensure the validity of the losses for each size. Experience with these and other samples indicates that there is considerable variation to be expected with different samples, even in the same class of materials. These variations, it appears, are not in any definite way associated solely with either natural material or newly manufactured material originating from numerous kinds of rock. The outstanding fact is that various sands of natural sources (as "river," "bank") and various manufactured sands from chemically and geologically different rocks show some loss of the kind under discussion, after a rest period, that is greater than errors resulting from manipulative variations when appropriate care is used with the screening operation.

Losses

In examining Table I it is observed that the lowest loss recorded is 3.5 percent for "A," plus 20-mesh minus 14-mesh, and is an appreciable one,

much in excess of any probable operative error by thorough screening on a refusal basis. The highest loss value of 66.2 percent in Item 9 for "C," plus 80-mesh minus 60-mesh, may have been of the "sport" variety, but the verifying of the weights involved leaves no doubt of the validity of the result. Reference to this "sport" value will be made again in discussing Table II. In general there seems to be no such regular distribution of the losses of the successive sizes as to afford any pattern from which certain losses could be used as predictive of others, size to size or material to material. In the sifting of mechanically crushed or pulverized rock, the smaller or more difficult to separate sizes may be estimated within fairly narrow limits by determining certain grading percentages on the coarser sizes. For instance, with any particular kind of rock, it can be determined experimentally that a certain total percentage passing, say, minus 20-mesh will represent a certain minimum percentage passing minus-50 or minus 100-mesh. No such regularity seems to have obtained in the breakage of the flaking type. But that does not invalidate the more potent fact that many, if not all, particles of sand in the course of time lose part of their grain mass and will then go through a smaller hole than they would before. This continues to happen with what is left on any sieve after the first "reduced-size" portion has been screened off. Likewise, the resifting of the "lost" portions (these again having been kept separate) has shown the same tendency for each portion to lose some of its grains to the next lower sieve size.

The lack of a regular breakage pattern from size to size is also disclosed for the relative length of successive periods of rest between siftings. Table II shows in Item 1 that sand "D" lost in four months 6.08 percent minus 14- to 20-mesh and that 0.11 percent went through 20 mesh. But in the next equal period of four months the portion that had remained on the 14 mesh lost 8.71 percent to the 20 mesh and 0.36 percent that went through 20 mesh.

Item 2 shows that in sand "E" almost equal losses occurred for periods respectively of six months and three months duration, not twice as much for the former as for the latter.

In the medium finer sizes (35 to 48 mesh and 80 to 100 mesh) it is apparent that sand "D" had greater losses in the second four-month rest period than in the first period of equal length, while sand "E" had, as might be expected, generally greater losses for the first six month period than for the second three-month period. The ratios of loss between the two periods in sand "E" are, however, not 2 to 1 to correspond to the relative lapses of time.

The occurrence of the high values for losses in Items 7-16 on sands "D"

and "E" shows that the high value of Item 9 in sand "C" of Table I may have been unusual but not impossible. It is noteworthy that in practically all cases where complete grading sieve tests were carried out, the greatest grain degradation occurred in the medium-fine sizes 35 to 100 mesh. It may be that the increasing rates of surface to volume as grains become smaller is reflected in an inherent propensity of sand grains to give way to some repressed expanding force and chip off specks of the surface. A person might think that age-old sand, as distinct from newly made sand, would have exhausted its breaking out or particle moulting tendency long ago. Repeated recent sieve tests contradict this opinion.

Conclusions

It is not difficult to envision the cleavage formation of new minute fracture-facets on the sand grains in a mass of concrete and the reduction of the area of effective bonding surface for the cement. The cement attached to a minute flake that has been split, or sprung, from the body of a sand grain from any cause, even though the flake has to stay in place, has lost its serviceability as a bonding agent in the concrete mass. The multiple occurrence of such facets presents first the possibility of the lessening of the strength which the concrete would otherwise normally have arrived at, as curing proceeded. Secondly, there is presented the possibility of the later gradual lessening of the maximum strength the mortar has attained. The substantiation of this surmise has not been accomplished by the author, but is presented as a problem the solution of which will reduce the number of unknowns affecting the ultimate strength of concrete.

Another phase of the systematization of the degradation peculiarities of sands would be the possibility of rating sands not merely on their "sharpness" or on the "fineness modulus." The degradation rating would be one more factor connected with the materials used, as distinct from methods and procedures in mixing and placing cement-concrete, by which the expected strength and stability of the latter after the lapse of years could be more accurately predicted than without that item of information.

Mechanism of Sulfate Attack on Cement

TESTS on the expansion of mortars in sulfate solutions indicate that the conversion of calcium hydroxide to gypsum is a contributory factor, according to F. M. Lea in the *Canadian Journal of Research*, Vol. 27, No. 4, April, 1949. The increased resistance to attack obtained by curing in steam under pressure appears primarily to be due to the suppression of this reaction and to the decreased permeability of the mortar.



General plant view showing new 290-ft. conveyor carrying sand stacker belt, with surge pile in foreground, screening plant in background

Combined Stationary and Portable Operation

Western Indiana Gravel Co. consolidates two pit operations; installs stacker belt conveyor to create 13,000-ton surge pile of pit-run material

PLANT No. 1, Western Indiana Gravel Co., Lafayette, Ind., has been operated continuously since 1916. Pit No. 2, a smaller operation, has been worked out and was closed in late 1949. When the decision was made to consolidate all operations at pit No. 1, material flow from pit to finished material stockpile was changed in several important respects. At the same time numerous large units of machinery were added to the operation. Possibly the largest single change was installation of a stacker belt conveyor in order to create a 13,000-ton capacity surge pile of pit-run material to feed the plant. A second important departure in material flow was erection of an overhead stacker belt approximately 65 ft. above ground level on 290-ft. centers to build ground storage stockpiles of concrete and masonry sand. Previously this material had been transferred from plant to stockpile area by truck or rail car.

This plant incorporates rail movement of material from pit face to plant

over standard gauge rails with side-dump cars pulled by 25-ton locomotives. Two new diesel-electric switch engines have recently been added to plant equipment, one for operation in the pit and the other, a 45-ton unit, for switching loaded aggregate cars from the plant to the stockpile area or to the main line. Another comparatively recent addition to plant equipment is a portable sand and gravel plant that operates in as many as five locations throughout the county in a nine-month season to service road jobs.

Pit Operations

Material is reclaimed from the pit by a 4-cu. yd. Bucyrus-Erie electric-powered dragline that is mounted on movable rails at ground level above the 50-ft. pit face. This dragline charges a 75-ton hopper that straddles railroad tracks on the pit floor. As pit face and tracks are extended, this hopper is jacked up on a standard gondola car and moved forward

as required. The two 25-ton locomotives in the pit, a new G. E. diesel-electric unit and a coal-fired American locomotive, haul two side-dump cars each with a total capacity of about 45 tons for a two car train. These cars are loaded from the movable pit hopper. Maximum grade between pit face and the plant is $3\frac{1}{2}$ percent. Pit cars are dumped to a 60-ton hopper with a 30- x 48-in. pan feeder serving a 30-in. belt conveyor on 275-ft. centers. Discharge end of this conveyor is elevated approximately 50 ft. and the subsequent surge pile built under it is sufficient to operate the plant for three days, with a dozer required on the final day to push material over the gates serving the reclaiming conveyor.

A 200-ft. reinforced concrete reclaiming tunnel, measuring 7 x 8 ft., extends under the surge pile and is fitted with 14 manually operated clamshell gates that discharge to a reclaiming belt conveyor operating in the tunnel. This conveyor extends 20



Four-cu. yd. dragline charges 75-ton hopper over standard gage railroad tracks in pit

ft. out the back end of the tunnel and operates under a second hopper that may be loaded directly by pit cars brought in on a side track. This provision has been made as a precaution against failure of the surge pile stacker belt or any other contingency that may arise in this part of the operation. The reclaiming belt transfers pit-run material to a 30-in. belt conveyor on 354-ft. centers for discharge at the crushing plant. At the transfer point a short belt conveyor operates at right angles to the main conveyors as a provision to load pit-run material directly to trucks.

Material is discharged from the

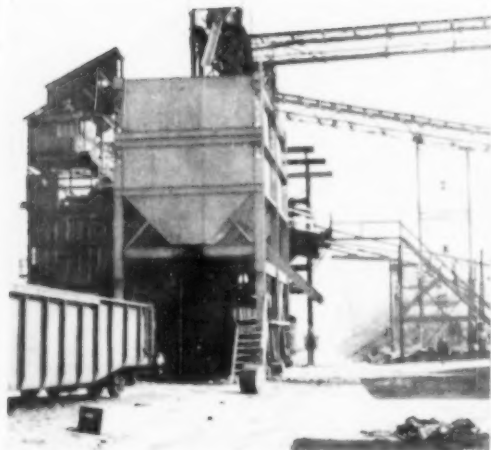
main plant belt on to a 4- x 14-ft. single-deck Simplicity scalping screen. Oversize from this screen goes to a second 4- x 10-ft. screen of the same make. Mesh on the second screen is varied from $\frac{3}{4}$ to 2 in. Usually mesh on the first screen is left at $\frac{3}{4}$ in., with the first mesh change in plant flow occurring on the second screen. Throughs from both screens go directly to a screening plant belt conveyor. Oversize from the two screens is transferred to a rotary screen of 48-in. I.D., 22-ft. long. Four size separations are made at this screen with the three larger being chuted to crushers. Primary crusher in this installation, tak-

ing plus 4-in. gravel, is an Allis-Chalmers gyratory set for 3-in. discharge. The secondary reduction unit is a 3-ft. Traylor gyratory set for 2-in. discharge, and final reduction is accomplished by a 3-ft. Symons gyratory set either for 1- or $\frac{3}{4}$ -in. discharge.

Make-up of this deposit is roughly 55 percent sand and 45 percent gravel, with very little gravel larger than 10 in. in diameter. Product of the three crushers is put over the second screen. Throughs from these two screens, as has been previously mentioned, in addition to throughs from the rotary screen, are collected by a 20-in. belt conveyor on 326-ft. centers for transfer to the screening plant mounted over rail or truck hoppers.

Sand Production

The belt discharges into either of both of two revolving screens, with one partially blanked off to act as a scrubber. Minus 5-16-in. sand from the revolving screens falls to a 14- x 40-ft. double-flight sand drag powered by a 35-hp. motor. Discharge from this drag is directed to a 5- x 12-ft. Tyler double-deck vibrating screen. Throughs from the top deck of this screen, which carries 5-32- x 1-in. slotted cloth, are chuted to two dewatering devices operating in parallel for producing concrete sand. Sand discharged from these units falls directly into gondola cars or trucks, or it can be transferred via a short belt conveyor to a plant bin for mixing with gravel. A third alternative is now provided by addition of a 24-in. belt conveyor on 88-ft. centers that carries the sand to a steel truck load-



Left: Steel sand hopper for loading to truck or railroad cars. Right: Partial view of crushing plant

STOCKPILING

ing hopper adjacent to the old plant hoppers.

At a point above the truck hoppers, sand on the conveyor from the screening plant belt may be diverted either to the bins below or to the 290 ft. long sand stacker belt. Method of recovery of this stockpiled sand is still being debated by the company management, with the alternatives offered of building a reclaiming tunnel large enough to accommodate trucks or of building a tunnel to serve a reclaiming belt conveyor that will be reversible to enable the loading of rail cars at one end and trucks at the other.

By addition of the belt conveyors that build or reclaim from the surge pile of pit-run material, plant efficiency has been increased at least 10 percent, according to H. E. Alberts, plant manager. The second new belt conveyor installation for stockpiling finished sand makes automatic and continuous an operation that previously had taken trucks and drivers to transfer surplus sand from hoppers to stockpile area, or time and expense to operate the switching engine and a clamshell to unload cars for the same transfer. When a reclaiming tunnel is built under the new sand stockpile, it will make loading of outgoing shipments less time- and labor-consuming as well. Shipments of sand and gravel from this plant are approximately 50 percent by rail and 50 percent by truck. A triple spur track adjacent to the loading hoppers has a capacity of 55 cars.

Water supply for the main screening and washing plant is supplied by a 10-in. Dean Hill pump mounted on a pontoon barge in a portion of the worked-out pit. This pump supplies 3000 g.p.m. at 125 ft. head. It is powered by a 100-hp. motor.

Portable Plant

When not in operation at one of five pits located throughout the com-



Diesel-electric locomotive, 45-ton, switches aggregate cars in stockpile area

ty, the Diamond portable crushing plant is used on one corner of the deposit of plant No. 1. This portable plant, powered by a D-13000 Caterpillar diesel, is driven through a flat belt and a gear box. Primary crusher is a 12- x 36-in. jaw; the secondary reduction unit is a 30- x 20-in. roll crusher. A double-deck screen is used on this unit, which normally carries 2- and 1-in. square mesh on the top and bottom decks, respectively. A P&H 1-cu. yd. dragline is mounted at surface level above the portable plant. This dragline, with a 50-ft. boom, loads directly to the crushing plant hopper or to a hopper over a 24-in. belt conveyor on 30-ft. centers that is swung in an arc about the plant as needed. This plant is used exclusively for the production of road gravel.

Officers

Officers of Western Indiana Gravel Co. are: R. R. Bookwalter, president; M. A. Neville, vice-president and general manager; J. H. Law, secretary-treasurer; H. E. Alberts, plant manager, and Lloyd Sheets, plant superintendent.



Portable crushing plant used for road work. Dragline charges hopper over 24-in. belt conveyor on 30-ft. centers

House Approves A.C.P. Appropriation

THE HOUSE has completed work on Chapter VI of the omnibus appropriation bill which covers the appropriations for the U. S. Department of Agriculture for the fiscal year ending June 30, 1951. The sum approved for the 1950 Agricultural Conservation Program is \$282,500,000 and the authorization for the 1951 program is \$285,000,000, the same figures recommended by the Subcommittee on Agricultural Appropriations.

All efforts either to increase or decrease any of the items, including an amendment of Representative Christopher (D) of Amoret, Mo., to increase the authorization for the 1951 A.C.P. to \$400,000,000 were defeated. According to subcommittee chairman Jamie L. Whitten, there is a tacit agreement in the subcommittee to keep the A.C.P. appropriation at \$285,000,000 each year, rather than to have the amount fluctuate.

Bureau of Standards Testing Publication

"Testing by the National Bureau of Standards," a new circular covering the Bureau's test policy, general information on testing, and lists of fees for most of the test work, has been announced. The 95-page Circular C482 is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 25 cents a copy.

Sand-Gravel Report Issued

A DETAILED REPORT on sand and gravel in northeastern Ohio, with a map showing where commercial deposits are located and emphasizing available deposits and regions where shortages exist, has been made available for distribution by the Department of Natural Resources, Division of Geological Survey, Orton Hall, Ohio State University, Columbus.

Sampling

Sampling Florida Dune Sands*

Obtaining samples of sand for test facilitated by use of a drive-pipe sampling method and the application of a water jet device, which should interest other producers

OCCURRENCES OF TITANIUM MINERALS, zircon and other heavy minerals are widespread in Florida. Deposits concentrated as "heavy sands" by the action of ocean currents, waves and wind have been mined on or near Atlantic coastal beaches since 1916.¹ An important inland concentration at Trail Ridge, believed to have been formed along an ancient shore line, was disclosed by investigations (1947) of the Bureau of Mines.²

Development of the Trail Ridge deposit was accomplished by using power auger drills redesigned so as to recover drive-pipe samples. In subsequent investigations in peninsular and northeastern Florida, experiments were made with other means of sampling the unconsolidated sand deposits.³

This report describes the methods adopted to secure greatest accuracy in sampling combined with speed of operation and minimum expense.

Description of Deposits

The Florida deposits of titanium and other heavy minerals occur as "dark" or "heavy" sand concentrations within the loose, unconsolidated beach and dune sands. These natural concentrations were accumulated by the sorting action of ocean currents, supplemented by wave and wind action in separating the heavy materials from the lighter beach or dune sand.

The beach deposits occur at the foot of the dunes near high-tide level and extend a short distance seaward. Martens refers to them as beds, called "strips," which are wider than they are thick and are elongated parallel to the shore line. As these deposits occur on the surface of the beach or under shallow overburden of loose sand, they were the first discovered and most extensively worked. Mined sands averaged about 20 percent "heavy" minerals, according to Martens.

Inland deposits occur along the ter-

By J. R. THOENEN†

aces of ancient shore lines or stabilized sand dunes. They have been subjected to erosion and wind action and do not display regularity in vertical shape or in horizontal outline. From Bureau of Mines investigations it appears that the concentrations, in general, parallel the axis of the Florida peninsula or parallel present shore lines. The shapes and sizes of the concentrated heavy mineral masses are erratic and occur at various horizons stratigraphically, some superimposed over others with barren ground between.

In most instances where concentrations were found, the permanent water table was close to the present land surface, ranging from 2 to 20 ft. This condition was found even though the heavy mineral horizon was stratigraphically above the surrounding land surface as in ridges or dunes.

Occasionally, buried vegetation in the form of logs or peat beds was en-

countered and at times there was some contamination with thin beds of clay or "hard pan." For the most part, however, heavy mineral concentrations occurred in loose, unconsolidated silica sand beneath the water table.

The "heavy" sand concentrations, in contrast to the beach deposits, averaged downward from 4 percent but individual deposits were much more extensive—that at Trail Ridge approximating 19 miles in length and 1000 to 4000 ft. in width.

Character of the Ore

The mineral-bearing material is an unconsolidated quartz sand of fine grain size (between 35 and 150 mesh or finer) associated with small amounts of clay and organic matter. The minerals present are equally fine grained, principally opaque and of specific gravity ranging from 3.00 to 5.00 as compared to 2.65 for quartz sand.

The economic minerals are zircon and the titanium group—ilmenite, leucocene and rutile. Other heavy minerals associated with them are kyanite, tourmaline, sillimanite, staurolite and occasional traces of corundum, garnet, gahnite and monazite.

*Published by permission of the Director, U. S. Bureau of Mines.

†Superintendent, Southern Experiment Station, U. S. Bureau of Mines, Tuscaloosa, Ala.

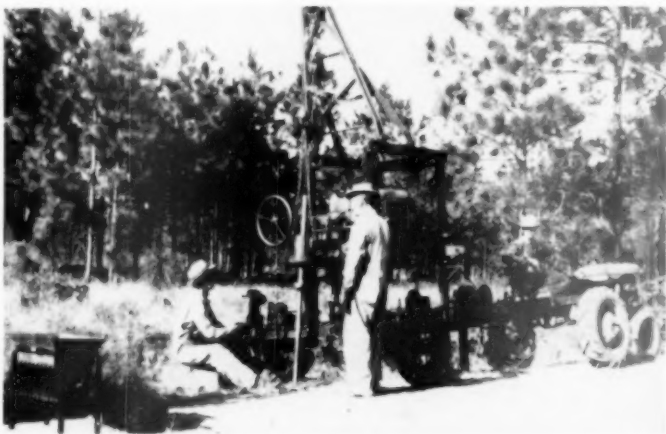


Fig. 1: Power auger redesigned for drive-pipe sampling. The operator is handling the rope to the "cat head;" the drive hammer is in motion

¹Martens, J. H. C., "Beach Deposits of Ilmenite, Zircon, and Rutile in Florida," Fla. Geol. Survey, 1916 An. Rept., pp. 124-131.

²Spencer, R. V., "Titanium Minerals in Trail Ridge," Bureau of Mines Report of Investigations 4208, 1948.

³Thoenen, J. R., and Warner, J. D., "Titanium Minerals in Central and Northeastern Florida," Bureau of Mines Report of Investigations 4515, 1949.

Problems Encountered

The physical character of the material in the deposits presented numerous problems differing from the routine sampling of unconsolidated materials.

The presence of overburden, usually barren, and the close proximity of the water table to the surface prevented trenching or test pitting to recover samples. The unconsolidated character of the sand effectually defeated all attempts to obtain satisfactory core with various types of core barrels.

Attempts to raise samples with a power or a hand auger were futile since the liquid character of the material allowed the auger merely to revolve without raising the sand on the auger flights.

Since the "heavy mineral" portion of the material to be sampled averaged only 4 percent or less, it was necessary that the sampling be sure and accurate.

It was anticipated that the percentage of heavy mineral present would vary vertically as well as horizontally and, consequently, it was necessary to know the depth interval from which each sample was taken.

Casing the holes to prevent wall contamination proved useless because sand and water followed up behind the sampling tool or bit as it was withdrawn from the casing.

It was necessary then to devise a method whereby samples accurately representing predetermined consecutive depth intervals could be obtained from a practically fluid material without removing the sampling tool until the desired hole depth had been reached.

Drive-Pipe Sampling

The problem was partly solved by using a drive-pipe sampling method. By this method a Parmanco power auger machine was converted to a

*Thomson, J. R., and Spencer, R. V., "Drilling Florida Dune Sands," Bureau of Mines Report of Investigations 4227, April, 1948.

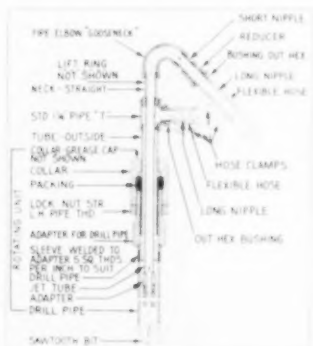


Fig. 4: Sectional drawing of double swivel which enables simultaneous intake of pressure water and ejection of sample



Fig. 2, left: Force pump connected to drill pipe ready to force core from pipe. Fig. 3, right: Core being extruded from drill pipe



"pile driver" (Fig. 1). The conversion was made by mounting a "cat head" on the rotary which ordinarily drove the augers. Sheaves were added and a rope was threaded from the cat head to the mast and down to a heavy drive hammer. The latter, a 100- to 160-lb. cylindrical piece of cast steel, was bored to pass over a pipe guide and rest on a collar screwed to the top of the drive pipe. By alternately tightening and loosening the rope on the cat head the operator could raise and drop the hammer on the pipe and thus drive it into the ground similar to the manner in which a pile is driven.

The drive pipe (flush joint steel tubing) was cut into approximately 3-ft. sections, each with male and female threads on the ends. As one section was driven into the ground the drive collar and guide were removed, a second section attached, the collar screwed to the new section and driving continued.

By this method holes could be drilled until the skin friction on the pipe became too great to drive farther. The depth reached depended largely on the type of ground pierced. At times 10 to 15 ft. was the limit; at other times as much as 30 to 40 ft. could be driven.

As each 3-ft. section of tubing was driven, the distance from the top of the core to the top of the pipe was measured by dropping a weighted tape inside the tube. This was recorded for each 3-ft. section. When the tubing was driven to refusal it was pulled intact and the core forced out by water with a hand operated force pump (Fig. 2). As it emerged from the tube it was caught in a wooden trough for measuring and examination (Fig. 3).

Each length of core corresponding to each 3-ft. drive was measured and marked. In this way the core from each 3-ft. interval in the hole could be identified.

The linear footage of core recovered

was usually about 50 percent of the distance driven. However, in driving the pipe most of the water in the core was forced out, and even in very liquid ground conditions the core formed a plug tight enough to prevent material from below rising in the tubing when driving ceased, as had been the case in casing holes cored by rotation. A simple calculation of pore space and comparison between very liquid material and the comparatively dry core showed that the "relative" recovery was considerably higher than the 50 percent linear measurement indicated.

However, there was some question as to just how accurately the core samples represented the interval driven, and a more positive method was sought.

Jet Sampling

The final method adopted was devised on the project. It consisted of using a Failing 1500 rotary core drill to rotate an outer drill rod or barrel



Fig. 5: Swivel is attached to top of drill rods. Pressure water enters through upper hose and sample leaves through lower hose

SAMPLING

fitted with a saw-toothed bit. Inside this drill rod was an inner rod of smaller diameter extending to approximately 6 in. above the bit (Fig. 4). Water under pressure was introduced through this inner tube while the outer tube was rotating. The inner tube did not rotate. Sand and ore dislodged by the rotating bit were raised by the water pressure, carried upward between the inner and outer tubes and discharged through a swivel and hose above the drive mechanism of the drill (Fig. 5). As the sand and ore emerged from the hose it was caught in a cotton bag held over the end of the hose (Fig. 6). The water and some clay sludge passed through the bag to waste, leaving the sand and "heavy" minerals in the bag.

No Sample Contamination

By this means the pressure on both top and bottom of the 6-in. core plug between the bit and the lower end of the inner tube was equalized. As a consequence, there was no sample contamination from an inrush of sand through the bit, as had been the case with revolving tools inside of casing. The outer tube or drill rod was rotated and driven by hydraulic pressure from the drill mechanism (Fig. 3). Its progress could be started or stopped at any predetermined depth. Upon reaching a desired interval depth, rotation and pressure were stopped, but jet water was continued until the water ejected at the sample bag ran clear. The sample was then removed, a new bag attached and drilling again started for the next sample interval.

In this way an accurate sample could be collected at any predetermined interval with assurance that no contamination could occur either from the walls of the hole or from the bottom of the hole.

Sampling continued at desired foot-age intervals in this manner until the required depth was reached, when the rods were withdrawn and the drill moved to the next site.

There was no need to fill completed holes since the moment the drill rods were withdrawn the holes filled nat-

urally.

This jet drilling method enabled holes to be extended to as much as 100 ft. or more in depth and at the same time proved to be faster and cheaper than the drive-pipe method.

The author and Clarence A. Orr, the drill runner, collaborated in de-



Fig. 6 Collecting sample at end of discharge hose

signing the mechanism for jet sampling, which permitted water under pressure to enter the inner non-rotating jet tube through a double swivel attached to the upper end of the drill rods and pass downward through the jet tube to a point above the bit attached to the outer rotating drill rod, and thence proceed upward in the annular space between the jet tube and the drill rod. This transported the dislodged sample to the double swivel and out through a connecting hose to the sample collecting bag. A public patent covering this design and apparatus was applied for on November 10, 1949. The device is shown in Fig. 4.

Drilling and Sampling Costs

The drilling and sampling costs for both types of drilling are given in Table I. These costs include preparation of samples as sent to the laboratory for analyses but do not include laboratory costs.

DRILLING METHOD	NUMBER HOLES DRILLED	NUMBER FEET DRILLED	NUMBER SAMPLES TAKEN	COST PER FOOT OF HOLE					TOTAL
				LABOR	SUPPLY	SUPERVISION	TRANSPORTATION	DEPRECIATION	
POWER AUGER	433	9284	1794	\$0.45	\$0.17	\$0.25	\$0.08	\$0.19	\$1.14
JET DRILLING	333	13,886	5499	0.25	0.11	0.12	0.05	0.12	0.65

* DEPRECIATION ON DRILLS AND EQUIPMENT IS COMPUTED ON A 2-YEAR OPERATING TIME PERIOD

† AN ESTIMATED \$2650 WAS EXPENDED ON EXPERIMENTAL WORK WITH THE JET DRILLING METHOD, THUS THE ACTUAL COST FOR JET DRILLING WAS \$0.65-\$0.19, OR \$0.46 A FOOT

Table I: Analysis of drilling costs

"Industrial Minerals and Rocks" Reviewed

INDUSTRIAL MINERALS AND ROCKS, second edition, revised by the A.I.M.E. Committee on Industrial Minerals, Samuel H. Dolbear, chairman of the editorial board, New York: American Institute of Mining and Metallurgical Engineers; 1156 pp.; illustrated; price \$8.

The second edition of this comprehensive volume incorporates the many developments and expanding technology in the industrial mineral field since the first edition was published in 1937. The 51 chapters cover all nonmetallurgical other than fuel, and each was written by an expert in the field.

The new edition is well-edited and carefully laid out. Pertinent data pertaining to the minerals are included in the chapters under headings such as origin and mode of occurrence, distribution, specifications, production and marketing, uses, prices, nomenclature, and tests and specifications.

Chapter headings include Abrasives, Asbestos, Barium Minerals, Bauxite, Bentonite, Bleaching Clay, Borax and Borates, Cement Materials, Chalk and Whiting, Chromite, Clay, Crushed Stone, Diatomite, Dimension Stone, Feldspar, Secondary Fertilizer Minerals, Fluorspar and Cryolite, Granules, Graphite, Gypsum, Heat and Sound Insulators, Lime, Lithium Minerals, Magnesite and Related Minerals, Manganese Ore, Mica, Mineral Fillers, Mineral Pigments, Minor Industrial Minerals, Monazite, Native Bitumens, Nitrates and Nitrogenous Compounds, Phosphate Rock, Potash, Precious Stones, Pumice and Pumite, Pyrophyllite, Quartz Crystal, Refractories, Salt, Sand and Gravel, Sillimanite Group, Slate, Natural Sodium Carbonate and Sodium Sulfate, Special Sands, Strontium Minerals, Sulfur and Pyrites, Talc and Ground Soapstone, Titanium, Tripoli, and Vermiculite.

The format is attractive, graphs, charts and type are easily read, and statistics presented clearly. The bibliographies, which are very inclusive, will undoubtedly be of great value to engineers and students.

Insoluble Portland Cement Residue

ABSTRACTED BY F. O. ANDEREGG

A MODIFICATION of the method of determining HCl insoluble residue in portland cement has been proposed by H. Steopoe in *Bull. Inst. Nat. Recherches Tech. de Monrovia*, vol. 3, No. 3-4, p. 43 (1948). Instead of boiling the residue after the HCl extraction with 5 percent Na₂CO₃ he washes the residue on the filter paper with cold 2 percent NaOH and obtains essentially the same result. The method has the advantage of being simpler since only one filter paper is required.

First Rotary Lime Kiln for Finland

By JOHN VITERCIK*

ABOUT A YEAR AGO a celebration was held at Nuottasaari, Finland: the building housing the new lime kiln of Oulu Osakeyhtio was finished. Another celebration took place when the lime kiln erected there was put into operation.

This large kiln, the first of its kind in Finland, which serves the sulfate cellulose industry, is making lime from calcium carbonate sludge, a waste product from cellulose. Until installation of the kiln, lime sludge was wasted on the mill site; burning the sludge has provided a useful end product and also eliminates the need for large waste ponds.

Inside a brick building which is 120 meters long and 9.5 meters wide, the rotary lime kiln has been erected, measuring 2.4 x 91.5 meters. The kiln has been lined with 9-in. high alumina brick. The raw material is filtered and fed into the lime kiln, and requires a travel time of three to four hours in burning the sludge into lime. The kiln is driven by electric motor; the plant requires 250-280 kw.

*Allis-Chalmers Mfg. Co., Milwaukee, Wis.

for capacity operation. The kiln is fired by industrial fuel oil, at the rate of 20 cu. meters of fuel per 24 hr. The firing temperature is 1150-1200 deg. C. The lime is carried over a special chain conveyor to storage.

The lime kiln produces up to 90 tons of lime per day, sufficient to satisfy the lime requirements of the mill. Until the kiln was installed, lime had to be brought by railway from South Finland, which involved high freight costs.

The lime kiln was shipped from the United States where it was fabricated by Allis-Chalmers Manufacturing Co. Warren Fogelberg, of Allis-Chalmers, spent seven months at Nuottasaari supervising the erection of the kiln. Some of the auxiliary equipment was obtained from European countries. The operating staff consists of five men who have recently been in Kalix, Sweden, for training in the burning of lime. Of interest is that the radiating heat from the lime kiln suffices also to supply heat for a new greenhouse where vegetables are being raised for the staff.

Percentage Depletion for Crushed Stone

IN ADMINISTRATIVE LETTER No. 7 to the industry, National Crushed Stone Association reports that a most important objective has been accomplished in an effort to obtain percentage depletion for crushed stone, including agricultural limestone. On May 9, 1949, Congressman Richard M. Simpson, Pennsylvania, a member of the Ways and Means Committee of the House where tax legislation must originate, introduced H.R. 4594 which reads:

"To provide percentage depletion for crushed stone. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that section 114 (b) (2) of the Internal Revenue Code is amended by inserting the words 'crushed stone' in the first sentence of said section after the words 'Rock Asphalt.'

"That section 114 (b) (4) of the Internal Revenue Code is amended by inserting the words 'crushed stone' in the heading of said section after the words 'Rock Asphalt.'

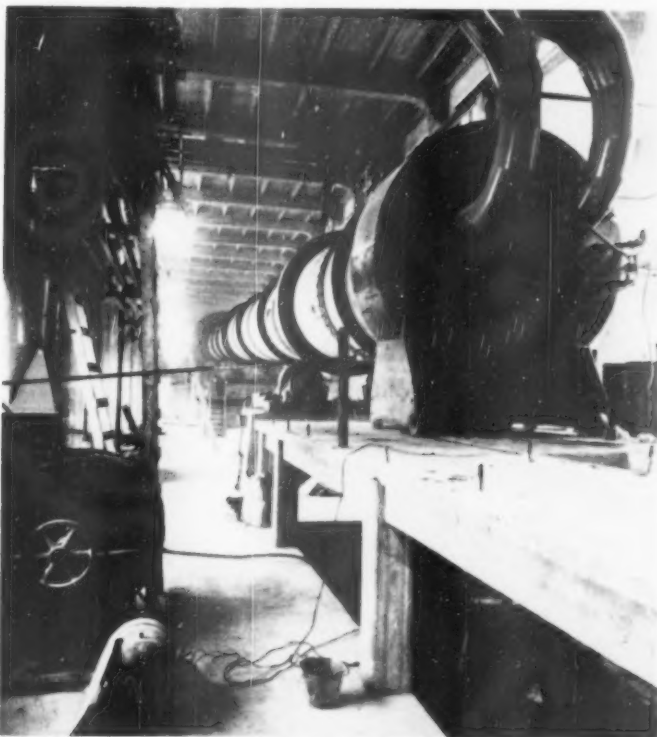
"That section 114 (b) (4) (A) of the Internal Revenue Code is amended by inserting the words 'crushed stone' in the first sentence of said section after the words 'Rock Asphalt.'"

The bill has been referred to the House Committee on Ways and Means which, in the event tax legislation is to be proposed at this session of the Congress, will undoubtedly hold hearings.

Idaho Phosphate Mining Report

A REPORT ISSUED recently by the Bureau of Mines states that although southeastern Idaho's large phosphate rock deposits now yield more than three-quarters of the entire western production of this important mineral commodity, their full commercial exploitation depends upon further improvements in mining and metallurgical practices. Under present day mining and processing methods, the reserves of phosphate rock there are estimated at 230,000,000 tons. At the present about 75 percent of the Idaho tonnage is produced by strip mining methods, but the publication discusses the feasibility of such other mining techniques as shrinkage stoping, square-set stoping, top slicing, room-and-pillar and longwall methods and caving methods. A summary of estimated mining costs involved in each of the methods also is included in the report, as well as estimates of local reserves and a discussion of the history and geology of the area.

Free copies of Information Circular 7529, "Phosphate Rock Mining in Southeastern Idaho," may be obtained from the Publications Distribution Section of the Bureau of Mines, 4800 Forbes Street, Pittsburgh 13, Penn.



Rotary lime sludge kiln installation, Nuottasaari, Finland



Section of the welding equipment display car

Power Exhibit on Rails

IF you see a sleek modern 10-car train in your town with hundreds of passengers seeming to pass through the coaches, it may be the General Electric "More Power to America Special," recently launched on a nationwide tour of many industrial centers to bring to operating men the latest advances in the production and utilization of electric power. The exhibit train will not be open to the general public. According to the company, only invited guests interested in electric equipment will be admitted.

Exhibits in the "Special" are grouped in 11 major sections: power generation, transmission and distribution; drives and controls, materials handling, welding, industrial heating, renewal parts, industrial lighting, components for industry, measurements, civic improvement, and national security.

The train is a planned element in a long term electrification program the company has been conducting since 1944. The purpose of the program is the communication of electrical ideas for industry, farm and city. To communicate these ideas, new and effective methods have been devised, such as motion pictures and the train.

Preparation of an exhibit in a tunnel 9½ ft. wide and 1000 ft. long had its problems. Wherever possible, actual apparatus is displayed. Where size and weight limitations have made this impractical, scale models or other representations have been used. There is a planned logical order to the train's

exhibits: visitors first see equipment for producing power, then apparatus for transmitting and distributing it, and finally, the techniques and products for utilizing it profitably. Most of the major exhibits go through an operating cycle automatically or can be operated by visitors.

The means by which modern elec-

trically operated equipment, properly applied, can effect substantial savings in materials handling expense is explained in the series of exhibits comprising the materials handling section of the More Power to America Special.

Exhibits of the latest designs of electric equipment used in modern materials handling systems are arrayed in this section. These include electric motors, controls, and accessories for cranes, hoists, conveyors, car dumpers, draglines and shovels; chargers, components and accessories for battery trucks, and switching, haulage, and mine locomotives in a wide variety of horsepower ratings for different specific industrial applications.

Among the exhibits is a slide-film presentation of the types of electrical equipment designed for materials handling functions in industry. Also displayed is a new 1¼-hp., 1750 r.p.m. electric truck motor which is capable of withstanding heavy overloads. Other new truck components displayed are a magnetic control panel and a dust-tight master switch with finger tip control. Both types of truck battery chargers, rectifier and motor-generator set, are displayed as a part of this exhibit.

Another exhibit illustrates the operation of a.c. and d.c. hoist drives. A model hoist mechanism enables visitors to raise, lower and "spot" a dummy load, using an actual pendant pull station. Crane drives, conveyor drives and other types of drives are exhibited in fully visible and operating models.

In another car is located the display of the welding section. New industrial arc welders, improved electrodes and new manual and automatic holders for the atomic hydrogen Inert-Arc welding processes are exhibited. Major exhibit panels feature the display of

(Continued on page 146)



Display of watt-hour meters in the measurements section

Presenting the New

FEDERAL *Style LINER* SERIES

*The Most Beautiful
Trucks in America!*



Here's the Truck...

THOUSANDS OF FLEET OPERATORS ASKED FOR!

In a nationwide survey, thousands of fleet operators confirmed the judgment and sound engineering back of the more than one hundred new and improved all-truck features built into the new Federal Style Liners . . . 30% greater strength . . . 60% greater vision . . . 100% greater accessibility . . . ultra smart styling . . . unrivaled beauty . . . massive appearance . . . extra wide and roomier cabs . . . unparalleled comfort . . . easier steering and new high standards of performance make these new Federals today's outstanding truck value. There is a large selection of Style Liner models . . . also a choice of several powerful high torque engines and wheel-bases to economically master your hauling needs. Make a date with your Federal dealer now to drive a new Style Liner. It doesn't cost any more to own a new Federal—the truck that has everything.

FEDERAL MOTOR TRUCK COMPANY, DETROIT 9, MICH., U. S. A.

"I SAW MOTOR TRUCK
HISTORY IN THE MAKING"

*Says
Lowell Thomas*

Internationally known news-
caster, writer and explorer.

Read his booklet describing
the new Federal Style Liner
trucks. Mail coupon below
today for your free copy.



Federal Motor Truck Company,
Detroit 9, Michigan, U. S. A.

Send me a free copy of Lowell Thomas' booklet
"I Saw Motor Truck History In The Making".

Name _____

Company _____

Address _____

City _____

Zone _____ State _____

FEDERAL



TRUCKS



More Proof Why **FEDERAL** *Style* **LINER** IS YOUR BEST TRUCK BUY!

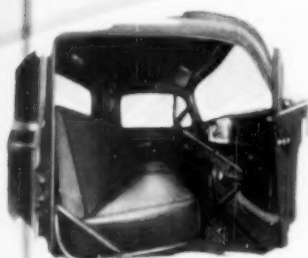
- ★ Longer, "smoother ride" front and rear springs for greater comfort—bigger payloads.
- ★ Rubber bushings in front springs and shackles provide quieter operation—longer spring life.
- ★ Heavy duty, wider track front axles for shorter turning radius.
- ★ Spring cushioned radius rod drive gives longer spring and axle life.
- ★ Built-in running boards with tool and battery compartments in step-wells for greater convenience.
- ★ Husky hypoid rear axles—the strongest ever built for the toughest handling jobs.
- ★ Pressurized cooling and increased radiator frontal area assures maximum engine performance.
- ★ Cabs have heavy duty chrome plated hardware. Doors are equipped with three heavy duty hinges.
- ★ Propeller shaft designed for maximum angle drive to rear axle. Shaft center bearing is rubber mounted for quiet, long life operation.
- ★ Big, sturdy brakes with wide lining area—stop quickly—operate cooler—last longer.
- ★ Powerful clutches with larger facing areas assure positive engagement—dependable service.
- ★ Heavy duty 4 or 5 speed transmissions of ample torque capacity for—quiet operation—easy shifting.

Over 100



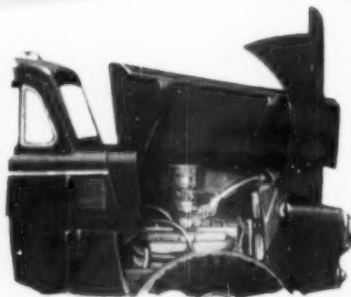
BIG, POWERFUL ENGINES

These husky, all-truck Federal engines are designed for maximum operating economy and dependable, long-life performance.



GREATER COMFORT, ROOMIER CAB

Seats accommodate three large men easily and are readily adjustable. Cabs are double insulated for all-weather protection.



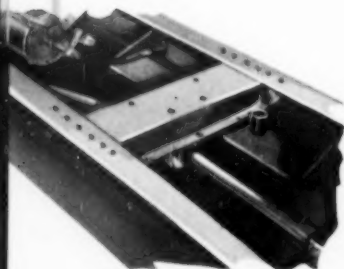
100% GREATER ACCESSIBILITY

New, exclusive "Swing-Lift" fender simplifies maintenance on engine, steering, front brakes, etc.—reduces down time—cuts repair costs.



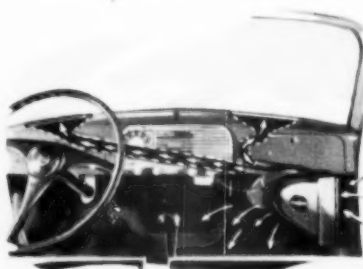
60% GREATER VISION

One piece, full width, bent safety glass windshield insures maximum visibility—eliminates distortion. Dual electric windshield wipers standard equipment.



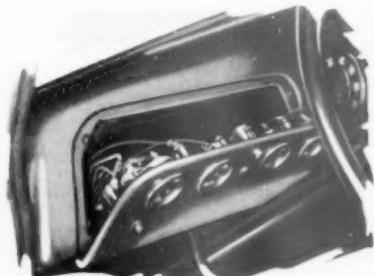
30% GREATER STRENGTH

Massive, sturdy frame side rail dimensions substantially increased and cold riveted for maximum strength and durability.



ALL-WEATHER AIR CONDITIONING

Fresh air heater and dehumidifier is available with cowl intake vent, thermostatically controlled for all-weather driving comfort.



ACCESSIBLE WIRING PANEL

Electrical wiring under cowl is readily exposed by opening a door in instrument panel. Wires are colored for easy tracing of circuits.

FEDERAL



TRUCKS

Labor Relations Trends

(Continued from page 79)

fits" shall mean any and all payments to which the participant is or shall become or upon application would be entitled in his own right under the Federal Social Security Act, as now or hereafter constituted, and shall not include benefits specifically provided under the Federal Social Security Act for persons other than the participant on account of the participant's coverage under said Act.

- (j) "Age" shall mean each participant's then attained age.
- (k) "Trust Agreement" shall mean the Agreement and Declaration of Trust by and between the Company and the Bank & Trust Company, dated as said Agreement may be amended from time to time.

SECTION III—Participation

1. Each employee of the Company, whose wages and other conditions of employment are affected by a collective bargaining agreement is eligible to participate in this Plan and, if qualified, receive the benefits set forth in Section V hereof, only if the Agreement between the Company and the bargaining unit affecting him so provides. Each salaried employee of the Company shall automatically become a participant in the Plan and, if qualified, receive the benefits provided for in Section V, hereof.

SECTION IV—Retirement and Qualifications for Benefits

1. Each participant who, while an employee of the Company, has attained age 65 on July 1, 1950, or attains age 65 thereafter shall be eligible to retire on July 1, 1950, or his attainment of age 65, whichever is later, and, if he has completed 10 or more years of continuous service, shall be eligible for retirement income benefits computed in accordance with Section V hereof.

2. A participant may remain in service of the Company after his attainment of age 68 or July 1, 1952, whichever last occurs, only with the consent of the Company and upon his retirement thereafter, if otherwise qualified, he shall be entitled to receive retirement income benefits.

3. Any participant who, while an employee of the Company, shall have completed at least 15 years of continuous service and shall have become through some *unavoidable* cause permanently incapacitated prior to his attainment of age 65 shall be entitled to a pension computed in accordance with Section V hereof upon his retirement after July 1, 1950. Included, but not all inclusive, under incapacities resulting from *avoidable* causes shall be such incapacities as (1) are contracted, suffered or incurred while the participant was engaged in, or result

from his having engaged in a criminal enterprise, or (2) result from his habitual drunkenness or addiction to narcotics, or (3) result from self-inflicted injury. A participant shall be deemed to be permanently incapacitated (as this term is used herein) only if he has been totally disabled by bodily injury or disease so as to be prevented thereby from engaging in any occupation or employment for remuneration or profit and such disability shall have continued for a period of 6 consecutive months and, in the opinion of a qualified physician, designated by the Committee, it will be permanent and continuous during the remainder of his lifetime. The permanency of any disability may be verified at the Committee's request by medical examination by a qualified physician appointed by the Committee at reasonable times prior to age 65 and any benefits granted on account of disability shall continue only so long as the participant shall be permanently incapacitated.

4. A participant shall apply for his benefits in writing on the form provided by the Committee, who may require the participant to furnish it such information as may be required to enable it to determine the participant's proper qualification for benefits.

SECTION V—Amount of Pension

1. The annual amount of retirement income (payable in monthly installments hereinafter provided) to which a participant shall be entitled shall be equal to 1 percent of his average annual earnings paid by the Company for the period of his continuous service with the Company from January 1, 1940, to the first day of the month next following his attainment of age 68 (July 1, 1952, for participants who attain age 68 prior to that date) or his retirement, whichever first occurs, multiplied by the number of years of his continuous service; provided, however, that

(a) one-half of any Primary Insurance Benefit under the Federal Social Security Act to which a participant is or shall become, or upon application would become, entitled shall be deducted from the retirement income payments provided, subject, however, to the provision that

(i) The minimum annual rate of retirement income payable to any participant who retires in accordance with the provisions of paragraph 1 or 2 of Section IV hereof and has completed 25 or more years of continuous service shall be \$720, inclusive of any Primary Insurance Benefits to which the participant is, or shall, or upon application would become, entitled under the

provisions of Title II of the Federal Social Security Act as said Act was constituted on January 1, 1950; or \$900 inclusive of any Primary Insurance Benefits payable under the Federal Social Security Act, if said Act is amended on or after January 1, 1950, to provide for an increase in Primary Insurance Benefits, and

(ii) The minimum annual rate of retirement income payable to any participant who retires in accordance with the provisions of paragraph 1 or 2 of Section IV hereof and has completed less than 25 years of continuous service shall be that percentage of the minimum annual rate of retirement income, computed as hereinbefore provided, which the participant's years of continuous service bears to 25; and

(b) any periodic payment (other than a single sum award disbursed in more than one installment) to a participant on account of injury or occupational disease, under laws relating to workmen's compensation and occupational diseases, shall be deducted in full from any retirement income payments hereinafter provided; and

(c) any periodic payment to which a participant is entitled under the provisions of any law to provide for compensation in the event of unemployment shall be deducted from the retirement income payments hereinafter provided.

A participant retiring in accordance with the provisions of paragraph 1 of Section IV hereof may elect to convert the retirement income otherwise payable to him into a reduced retirement income of equivalent actuarial value all or a portion of which, as he elects, will be continued to a contingent beneficiary of his selection, in the event said contingent beneficiary survives him. The election or rescission of this option shall be subject to such advance notice and other conditions prescribed by the Committee, which conditions must be uniform in application and applicable to all participants similarly situated.

2. Each retirement income payment shall be made in monthly installments with the first monthly installment payable on the first day of the month next following the date on which the participant retires and ceasing with the last payment prior to the participant's death or the date on which the incapacity of any participant is verified to be non-permanent by a qualified physician appointed by the Committee.

(Continued on page 140)

REBUILD WORN CRUSHER ROLLS



with

MANGANAL

(T.M. Reg. U.S. Pat. Off.)

11% - 13 1/2% MANGANESE-NICKEL STEEL

ROUND APPLICATOR BARS and ELECTRODES

- **ROUND APPLICATOR BARS** speed repairs, replace worn metal faster, more economically than with electrodes alone.
- **REBUILD ROLLS** often outlast new ones . . . MANGANAL is denser than cast manganese steel.
- **COST IS FAR LESS** than that of new rolls.
- **ELEVEN SIZES OF MANGANAL** Round Applicator Bars are available for all conditions of wear.
- **ATTACH WITH MANGANAL** Bars or Special Tite-Kote Electrodes for greatest strength and longest wear.

Write for **FREE** copy of "Manganal Marketer" . . . outlines newest methods for economical repairs.

NAME OF NEAREST DISTRIBUTOR
ON REQUEST

STULZ-SICKLES CO.

SOLE PRODUCERS

91 N. J. Railroad Ave., Newark 5, N. J.

SECTION VI—Contributions

1. All contributions to provide benefits under the Plan shall be made by the Company and no contributions shall be required of the participants. Contributions by the Company shall be made to the Trustee in such amounts and at such time as the Board of Directors shall from time to time determine. The Company shall have no obligations to make contributions to the Plan except as and to the extent authorized by the Board of Directors.

SECTION VII—Right of Participants

1. Participation in this Plan shall not give any right to any participant to be retained in the employ of the Company nor shall it interfere with the right of the Company to discharge any participant and to deal with him without regard to the existence of this Plan and without regard to the effect that such treatment might have upon him as a participant in the Plan. No participant shall have any right or claim to a retirement income except to the extent that he qualifies for a retirement income in accordance with the terms and conditions of this Plan.

SECTION VIII—Non-alienation of Benefits

1. To the extent permitted by law, no benefit under this Plan shall be subject in any manner to anticipation, alienations, sale, transfer, assignment, pledge, attachment, encumbrance or charge and any attempt so to do shall be void.

2. If any participant or contingent beneficiary under this Plan becomes bankrupt or attempts to anticipate, alienate, sell, transfer, assign, pledge, encumber or charge any benefit under the Plan, such benefits shall, in the discretion of the Committee, cease and terminate and in that event the Committee shall hold or apply the same to or for the benefit of such participant, contingent beneficiary, his spouse, children or other dependents or any of them, in such manner and in such proportion as it may deem proper.

SECTION IX—Management of Funds

1. All assets of the Plan shall be held in trust by the Trustee under the Trust Agreement for use in providing the benefits of the Plan. No part of the corpus or income of said Trust shall be used for or diverted to purposes other than for the exclusive benefit of participants or their contingent beneficiaries, if any, under the Plan prior to the satisfaction of all liabilities with respect to such participants and their contingent beneficiaries, if any. The Trustee shall invest and manage the funds of this Plan subject to the provisions of the Trust.

2. The funds of the Plan shall be disbursed for purposes provided for in the Plan by the Trustee pursuant to the direction of the Committee. No person shall have any interest or right

to any part of the earnings of the Trust or rights in or to or under the Trust or any part of the assets thereof except as and to the extent expressly provided for in this Plan.

SECTION X—Administration of the Plan

1. The general administration of this Plan and the responsibility for carrying out the provisions thereof shall be placed in the Committee. The Committee shall consist of five members appointed by the Board of Directors to serve at the pleasure of the Board. The Committee shall elect a Chairman from its membership, and a Secretary who need not be one of its members.

2. Any person appointed a member of the Committee shall signify his acceptance by filing written acceptance with the Board of Directors and with the Secretary of the Committee. Any member of the Committee may resign by delivering his written resignation to the Board of Directors and to the Secretary of the Committee and such resignation shall be effective upon delivery or at any later date specified therein. No member of the Committee who is also an employee of the Company shall receive any compensation for his services on the Committee. No bond or other security need be required of any member of the Committee in such capacity in any jurisdiction.

3. Subject to the provisions of this Plan, the Committee from time to time shall establish rules for the administration of this Plan and the transaction of its business. It shall hold meetings upon such notice, at such place or places, and at such time or times, as it may from time to time determine. Expenses incurred by the Committee in the transaction of its business shall be borne by the Company.

4. The Committee may appoint from its members such subcommittees with such powers as it shall determine; may authorize one or more of its members, or its Secretary, or any agent, to execute or deliver any instrument or make any payment on its behalf (provided, however, that a request for funds from or a direction for any payment of funds by the Trustee shall be given only by or pursuant to action by the Committee); and may employ or appoint agents, counsel, accountants, actuaries and such clerical and other services as it may require in carrying out the provisions of this Plan.

5. The Committee shall have the exclusive right (except as to matters reserved to the Board of Directors or which the Board of Directors may from time to time reserve to itself) to interpret this Plan and to decide any and all matters arising thereunder. In that respect it shall not discriminate in favor of officers, shareholders, employees whose principal duties consist of supervising the work of other

(Continued on page 142)

MURPHY DIESEL

blankets the nation



Map Copyright
American Map Co., Inc. N.Y.
No. 11154

SALES.. PARTS.. SERVICE

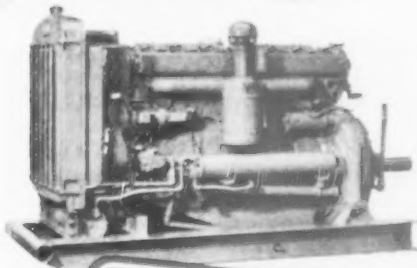
MURPHY DIESEL DEALERS, strategically and conveniently located throughout the United States, are ready to assist you. Backing these dealers are direct factory sales engineers located in the field whose sole purpose it is to aid the dealers in serving you. This complete field organization is fully qualified to help analyze and handle your complete power requirements promptly and efficiently. This is another of the many good reasons for using Murphy Diesel power.

Further, Murphy Diesel simplicity of design and rugged, heavy duty construction means —

More Power Greater Dependability
Greater Economy Longer Life

Get acquainted with your Murphy Diesel Dealer, now, and let him show you how Murphy Diesels can deliver more horsepower for fewer dollars. If you do not know your dealer's name, we'll be happy to send it to you.

MURPHY DIESEL COMPANY
5315 W. Burnham St. Milwaukee 14, Wis.



**MURPHY
DIESEL**

Heavy duty power
for all services

Murphy Diesel engines and power units
are made in sizes from 90 to 220 H. P.;
generator sets from 60 to 133 K. W.

MORE NEWS ABOUT THE NEW


Thor WAGON DRILL

**CONTROLLED FEEDING
AT SPEEDS AS SLOW AS
2 INCHES PER MINUTE**

CONTROLLED FEEDING . . . rapid return
... infinitely variable slow or fast travel
to meet ANY drilling or maneuvering need
... under ANY conditions . . . Rig is COM-
PLETELY MANEUVERABLE—drills in ANY
direction on ANY terrain . . . Tests prove
Thor 4" Drifter is powerful enough to out-
drill anything in its class! Tests run on your
job at our expense—call your Thor distri-
butor or wire Independent Pneumatic Tool
Co., (Thor Tools), Aurora, Ill.

Write Today
For Thor
Wagon Drill
Circular





PORTABLE POWER

TOOLS

ELECTRIC • PNEUMATIC

Air Feed Logs

Backstop Tampers

Belt Sanders

Bench Grinders

Chipping Hammers

Concrete Surfaceers

Clay Diggers

Drills

Drummers

Electric Hammers

Impact Wrenches

Paving Spreaders

Pile Drivers

Roll Drills

Tampers

Tools

Wire Tampers

Wagon Drills

employees, or highly compensated employees. All decisions of the Committee in respect of any matter hereunder not reserved to the Board of Directors (and all decisions of the Board of Directors on matters reserved to it) shall be final, conclusive and binding upon all persons having or claiming to have any right or interest in or under this Plan.

6. The Committee from time to time shall adopt service and mortality tables for use in all actuarial calculations in connection with this Plan and shall determine the rate of interest to be used in such calculations. As an aid to the Committee in adopting tables and in determining the amount of contributions required from year to year, the actuary selected by the Committee shall make periodic actuarial studies of the assets and liabilities of this Plan and shall recommend to the Committee tables and rates of contributions. The Committee shall in turn recommend to the Board of Directors the rate of contributions to be made by the Company from year to year.

7. The Committee, the Board of Directors, the Company and its officers shall be entitled to rely upon all tables, valuations, certificates and reports furnished by any actuary, upon all certificates and reports made by any accountants, and upon all opinions given by any legal counsel, in each case duly selected by the Committee in accordance with the provisions of this Plan. The members of the Committee, of the Board of Directors, the Company and its officers shall be fully protected in respect of any action taken or suffered by them in good faith in reliance upon any such tables, valuations, certificates, reports or opinions, and all actions so taken or suffered shall be conclusive upon each of them and upon all persons having or claiming to have any interest in or under this Plan. The members of the Committee shall use ordinary care and diligence in the performance of their duties but no member shall be personally liable by virtue of any contract, agreement, bond or other instrument made or executed by him or on his behalf as a member of the Committee; nor for any mistake of judgment made by himself or any other member of the Committee, nor for any negligence, omission or wrongdoing of any other member or of anyone employed by the Committee, nor for any loss unless resulting from his own gross negligence or wilful misconduct.

SECTION XI—Rights and Obligations of Company

1. The Company assumes no obligation for the payment of retirement income or other benefits under this Plan. All benefits under this Plan are to be paid from funds held by the Trustees.

2. The Company, by action of its Board of Directors, may discontinue pension payments hereunder to any participant who in its opinion enters

into employment after retirement which is in any way detrimental to the interests of the Company.

3. The Company, by action of its Board of Directors, may terminate this Plan. In the event of termination of this Plan, the assets of the Trust shall be used to provide benefits accrued under this Plan to the date of termination for participants and their contingent beneficiaries, if any, in the following order:

- (a) to provide retirement benefits under this Plan for all retired participants, participants eligible to be retired by the Company, and their contingent beneficiaries, if any;
- (b) to provide retirement benefits under this Plan for participants eligible to retire in their own right at the time of termination of the Plan;
- (c) to provide the retirement benefits under this Plan for and account of other participants to the extent of the value of their respective benefit credits as the same may be determined by the Committee as of the date of termination of this Plan;
- (d) the balance, if any, arising as the result of erroneous actuarial computations during the previous life of the Trust and remaining after the satisfaction of all liabilities for benefits accrued under this Plan prior to the date of termination with respect to participants, their contingent beneficiaries, if any, shall be returned to the Company.

In making the provisions required in this paragraph 3, assets which the Committee shall deem sufficient shall first be allocated to provide in full the benefits of each class before allocating any assets to any subsequent class. If the remaining assets are insufficient to provide in full for the benefits in any class, the benefits of all participants and contingent beneficiaries of that class shall be reduced pro rata. The Committee shall instruct the Trustee as to the application of the assets in accordance with the provisions of paragraph 3 of this Section XI.

4. The Committee shall have authority, with the approval of the Board of Directors, to direct the Trustee to purchase immediate or deferred annuities for any class or classes described in paragraph 3 of this Section XI.

5. Notwithstanding the provisions of paragraph 2 of this Section XI, if this Plan is terminated, or as long as the full current cost thereof has not been met by the Company at any time during the first ten years from its effective date, the retirement income which any of its highest paid participants may receive under this Plan shall not exceed his unrestricted benefits at that time. These conditions shall not prohibit the payment of the

Order your low-cost Bantam NOW!



CRANE.....\$4865*
Lifts up to 10,000 lbs.
MOUNTS ON NEW OR USED TRUCK



TRENCH HOE...\$290*
Digs 100' of 5' trench per hr.
RUNS ANYWHERE, ANYTIME



DRAGLINE.....\$260*
Digs up to 70 yds. per hr.
GOTS IN WHERE BIG RIGS STOP



SHOVEL.....\$455*
Digs up to 80 yds. per hr.
MAKES MONEY ON EVERY JOB

WHY TIE UP BIG EQUIPMENT, when so many of your jobs can be done *faster, easier, at less cost with a low-priced Bantam?* You'll find Bantam ideal for spotting steel, lifting pipe . . . loading and stockpiling materials . . . digging basements, sewer and water lines, etc. Gives you **BIG SAVINGS** on production jobs . . . **BIG EARNINGS** on scattered jobs. In fact, *there's still time for a Bantam to pay for itself on your operations yet this year.* So don't delay — get your Bantam order in **TODAY!**

SB-C4

TEAR OFF and MAIL THIS HANDY COUPON NOW!

SCHILD BANTAM CO.

216 Park St., Waverly, Iowa

☐ Send full details on new Bantam checked at right

- ☐ Shovel
- ☐ Crane
- ☐ Dragline
- ☐ Clamshell
- ☐ Trench Hoe
- ☐ Pile Driver

Name _____

Occupation or Business _____

Address _____

City _____

State _____

SB-C4

SCHILD BANTAM
The **THRIFTY** machine with the **BIG** earning range

YUBA dredge originally used for mining gold and sapphires, excavates from stream bed and deposits material into cofferdam backfill.



STRIP A DAM SITE WITH A YUBA DREDGE? *Yes*

At Canyon Ferry Dam on the Missouri River near Helena, Montana, Canyon Constructors save months of time by using a YUBA dredge to handle dam site excavation and cofferdam backfilling in one operation instead of separately.



Dredge stacker also discharges to haul road directly into trucks or for rehandling by shovel and trucks.

DREDGE REMOVES BOULDERS

Sub-contractor Perry & Schroeder Mining Co. moved in a Yuba placer dredge with 6 cu. ft. buckets and 48 ft. digging depth, dug out boulders so sheet piling could be driven for cofferdams. Then the dredge began excavating and backfilling the cofferdams; stripped 250,000 cu. yds. of underwater overburden down to bedrock by the time the diversion flume was ready.

AVERAGES 320 CU. YDS. PER HOUR

Altogether the dredge will handle about 1,000,000 cu. yds. of material, including production of aggregate from underwater deposits. It works three 8-hour shifts daily, averages 320 cu. yds. hourly; has a reach from bucket line tip to stacker end of 250 feet and can discharge material 40 feet above water line.

Consult YUBA—No matter what your bucket ladder dredging problem—digging deep ground, clay, boulders, or bedrock; constructing levees, cofferdams or canals; producing aggregate or changing stream channels—YUBA can help you. Write or wire us TODAY. No obligation.



YUBA MANUFACTURING CO.

Room 717, 351 California St., San Francisco 4, California, U.S.A.

AGENTS: BIME, DAWY & CO., LTD., SINGAPORE, KUALA LUMPUR, PENANG.
SHAW DAWY & CO., LTD., 14 & 19 LEADENHALL ST., LONDON, E.C. 3.
CABLES: YUBAMAN, SAN FRANCISCO. SHAWDAREDD, LONDON.

full retirement income called for by this Plan to a contingent beneficiary of a former participant who died while this Plan is in full effect and its current costs have been met.

For the purposes of this paragraph 5:

- (a) the term of the "highest paid participants" shall mean such of the twenty-five highest paid participants at the effective date whose anticipated annual retirement income determined under this Plan exceeds \$1,500;
- (b) the term "unrestricted benefits" shall mean the benefits under this Plan payable to the participant or his contingent beneficiary which have been provided by Company contributions not exceeding the larger of the following amounts: (A) \$20,000; or (B) an amount equal to 20 percent of the first \$50,000 of the participant's annual earning rate at the effective date, multiplied by the number of years since such effective date.

SECTION XII—Amendments

1. Subject to the provisions herein after set forth, the Company reserves the right, at any time or from time to time, by action of its Board of Directors to modify or amend in whole or in part any or all of the provisions of this Plan; provided that no such modification or amendment may be made which, by reason thereof:

- (a) will deprive any participant or contingent beneficiary without his consent of any benefit credits which may theretofore have been accrued by him under this Plan; or
- (b) shall make it possible for any part of the corpus or income of the Trust established pursuant to this Plan to be used for, or diverted to, purposes other than for the exclusive benefit of participants, or their contingent beneficiaries under this Plan prior to the satisfaction of all liabilities with respect to such participants, or contingent beneficiaries under the Trust established pursuant to this Plan.

2. Notwithstanding the provisions of paragraph (1) of this Section XII, or of any other provision of this Plan, any modification or amendment of this Plan may be made, retroactively if necessary, which the Company deems necessary or appropriate to conform this Plan to, or to satisfy the conditions of, any law, governmental regulation or ruling, and to permit this Plan or Trust to meet the requirements of Section 165(a) and 23(p) of the Internal Revenue Code or the corresponding provisions of any subsequent revenue law and, except as provided to the contrary in sub-paragraph 1(a) (i) of Section V hereof, the Company reserves the right to make retroactive changes in the Plan in the

event of future changes in the Federal Social Security Act.

SECTION XIII—Construction

1. This Plan shall be construed, regulated, and administered under and in accordance with the laws of the State in which the Trust is created.

Perforated Bucket

(Continued from page 123)

equally enthusiastic about this type of bucket for stripping and for digging the gravel, much of which is below water line. Strippings are cast back into worked out portions of the pit and the gravel is hauled to the plant in a fleet of five Euclid rear-dump trucks.

The plant, built in 1927, uses a 13-x 24-in. Bacon jaw crusher and a 4-ft. short-head and a 3-ft. standard Symons cone crusher. McLanahan and Stone log washers scrub and prepare the gravel for the Tyler vibrating screens that are used in the plant.

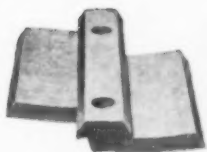


Bucket rests of water line with drainage completed through holes in back of unit

The operation is located about two miles from the James river and is on a rail siding of the C & O railroad. A considerable volume of material moves out from the plant into trucks. John Twohy II is president of the company, which has its head offices at Norfolk, Va.

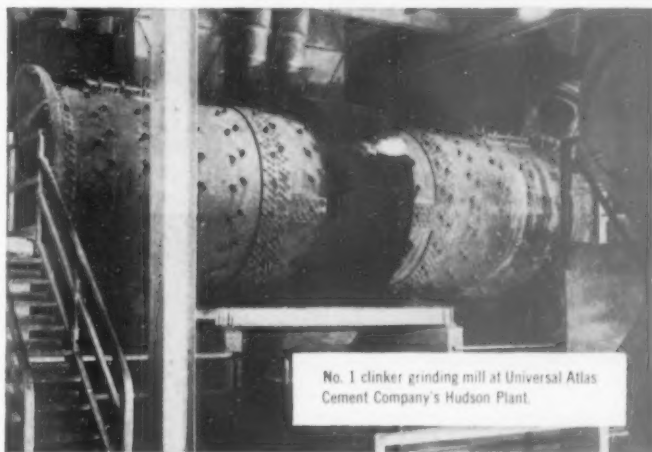
Determining HCl Insoluble Residue in Portland Cement

A MODIFICATION of the method of determining HCl insoluble residue in portland cement has been proposed by H. Steepow (*Bull. Inst. Nat. Recherches Tech. de Roumania*, Vol. 3, No. 3-4, p. 43, 1948). Instead of boiling the residue after the HCl extraction with 5 percent Na_2CO_3 , he washes the residue on the filter paper with cold 2 percent NaOH and gets essentially the same result. The method is thereby simplified, only one filter paper being required.



LORAIN ROLLED PLATE LININGS

...for better grinding results
...on any type of mill

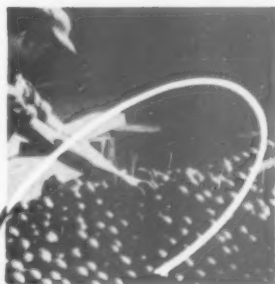


No. 1 clinker grinding mill at Universal Atlas Cement Company's Hudson Plant.

ON various types of grinding jobs all over the country, Lorain Rolled Plate Linings are helping to increase production, save time, and cut costs. Because the parts are made to accurate size and in easily-handled sections, they save hours of labor and reduce mill down-time. And because of the great strength of the rolled steel from which they're made, plates of reduced thickness can be used—thereby increasing the usable diameter of the mill and boosting output.

In some applications, as lift bars wear down in service, Lorain Rolled Plate Liners may be restored to full grinding efficiency—and to the equivalent of a second lining—by renewing the lift bars at only partial lining costs. Where pronounced variance in wear occurs at feed and discharge ends, the liner plates, being made symmetrical and interchangeable, may be reversed to opposite ends of mill to balance wear. Such flexibility and ease in restoring lining efficiency means reduced grinding costs.

U-S-S Lorain Rolled Plate Linings are available through leading mill manufacturers whose names will be furnished upon request.



Use U-S-S GRINDING BALLS
to make better, more
economical grinding doubly sure.

U-S-S Grinding Balls are especially made for the industry to the most exacting specifications of hardness and toughness. Standard sizes available from $\frac{1}{4}$ " to 5".

CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH • COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

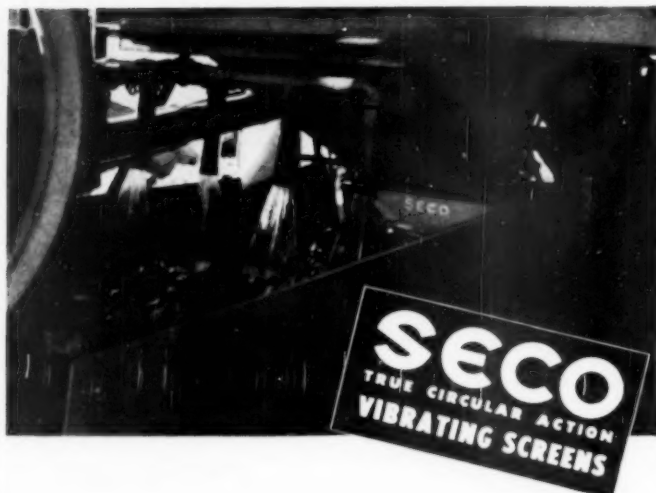


LORAIN ROLLED PLATE LININGS AND GRINDING BALLS

UNITED STATES STEEL



No Lazy Spots . . .



Here's the kind of efficient screening of materials that Seco Vibrating Screens are performing day after day, year after year. Seco's patented construction puts every inch of screen to work . . . there are no "lazy spots" to rob you of tonnages and profits. Get the whole Seco story. Send for Catalog No. 203, Dept. M.

Made only by Screen Equipment Co., Buffalo, N. Y.
In Canada: United Steel Corp., Toronto, Ont.

Seco distributors are located throughout the United States. Write for name of the one nearest you.



Power Exhibit

(Continued from page 136)

actual equipment. Samples of weld beads from hard-to-weld metals such as aluminum, magnesium, steel and copper are included in the welding displays.

In still another of the eight exhibit cars is located the measurement section. More than 250 different precise



The 10-car exhibit train is hauled by a 4500-hp. two unit diesel-electric locomotive

instruments designed to perform scores of services throughout industry are presented there. The exhibits emphasize the importance of accurate measurement in every phase of industrial activity.

The various types of instruments in the measurement section display are grouped according to the general functions they perform, such as measurement of electric power and energy, instrument transformers, testing and measuring instruments, measurement of time, light, color, strain, roughness, speed, metals, thickness, leakage (for pressure systems), and vibration.

Three State Groups Name Officers

INDIANA MINERAL AGGREGATE ASSOCIATION, INC. at its annual meeting elected L. F. Hart, Wabash Sand & Gravel Co., as its president. E. L. Heckathorn, Stuntz-Yeoman Co., was elected vice-president and C. W. Siniff, American Aggregates Corp., was elected secretary-treasurer.

Iowa Agricultural Limestone Association, Inc., elected Ray Cook, Sr., of Ray Cook Construction Co., as its president at the annual meeting held in Des Moines in March. C. M. Kirtlye, Missouri Valley Limestone Co., was elected vice-president.

Officers elected at the Kentucky Crushed Stone Association meeting in March were J. F. Pace, president, and Martin T. Smith, vice-president.

Northern Illinois Limestone Producers Organize

NORTHERN ILLINOIS LESTONE PRODUCERS ASSOCIATION, has been organized by nineteen producers with L. S. Hackney as president. Truckers, dynamite men, manufacturers and machinery dealers are being accepted as associate members.

Slag for Glass Manufacture

The May, 1949, issue of **ROCK PRODUCTS** contained an article describing in detail the new slag processing plant of American Materials Corp., New Miami, Ohio. In the discussion of different uses of slag, the article failed to mention that all of the slag used by the glass industry from this plant is handled by The Calumite Co., Hamilton, Ohio. This company was organized in 1944 by E. W. Hopkins, who prior to that time was associated with the glass container industry.

The story of blast furnace slag as a batch ingredient for glass is an old one. Many glass companies in Germany used it as far back as 1925. Various universities have studied its behavior in glass, on a small scale, since 1922. However, The Calumite Company is said to have been the first to venture into this field on a commercial scale, and its sole business consists of slag for the glass industry.

Through its efforts and experiments, The Calumite Co. claims it has been successful in showing the industry how to use greater quantities of slag in its glass than formerly believed possible. In the process, important findings concerning the basic chemistry of glass-making have been discovered also. The Calumite Co. has no connection whatever with any glass company or subsidiary except in a sale-consumer relation.

Magnesite for Refractories

STANDARD SLAG CO., Youngstown, Ohio, is milling approximately 50 tons of magnesite daily in a new pilot plant in the Gabbs, Nev. area. The unit is producing magnesium cement for furnace linings and other refractories. Its capacity is to be enlarged following conclusion of tests and experiments. R. O. Jones is manager of operations.

Properties owned by Standard Slag were acquired two years ago from U. S. Brucite Co. Adjoining the brucite and magnesite deposits, worked on a major scale more than 20 years by Basic Refractories, the Standard Slag properties contain large reserves of magnesite ore.

Norwegian Cement Production

DURING 1948 improvements were made to three cement mills in Norway with purchase of modern equipment to increase production and efficiency. Cement production rose from 436,211 metric tons in 1946 to 472,612 metric tons in 1947 to 526,187 tons in 1948. Despite the increased output of Norwegian cement mills, Norway is faced with the problem of whether to use the cement for local construction purposes or to export the commodity in order to gain foreign exchange, urgently needed at this time.

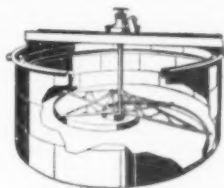


**"Don't jump! There's still hope!
try HARDINGE SEPARATORS"**



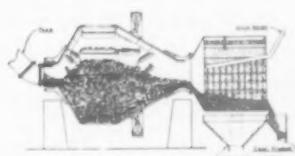
COUNTER-CURRENT SEPARATORS

Particularly adapted for removing dirt and fines from sands in a washing or closed-circuit grinding operation. Also highly successful as a proven separator in the heavy-media or "sink-float" process. Easy starting, low horsepower requirements, and remarkably low maintenance. Write for Bulletin 39-B-7.



**THICKENERS -
HYDRO-CLASSIFIERS**

For separating fine suspended solids from liquids. "Auto-Raise" drive mechanism prevents scraper breakage. Bulletin 31-D-7.



CONICAL SCRUBBERS

For separating adhering clay, silt, etc., from phosphate rock, gravel and many other materials. Cleans by "mass action" — a strong scrubbing effect obtained by continuous strata movement. Bulletin 37-A07.

HARDINGE

COMPANY INCORPORATED

YORK, PENNSYLVANIA — 240 Arch St. • Main Office and Works
NEW YORK 17—122 E. 42nd St. • 205 W. Wacker Drive—CHICAGO 6
SAN FRANCISCO 11—24 California St. • 200 Bay St.—TORONTO 1

THE WIRE ROPE

You Can
Depend on—



HERCULES (Red-Strand) Wire Rope always lives up to its widespread reputation for outstanding performance... even under the severest conditions. For safe and economical operation, specify **HERCULES ("Red-Strand")**.

Made only by—

A. LESCHEN & SONS ROPE CO.

5909 Kennerly Ave. St. Louis 12, Mo.
Est. 1857
New York 6 • Chicago 7 • Birmingham 6
Denver 2 • Houston 3 • Los Angeles 21
San Francisco 7 • Portland 9 • Seattle 4

**Tired of your
Jaw Crusher
Wedge
Adjustment?**

**..The New
Hydraulic
Shim Jack**

*is the
answer!*

GRUENDLER

**Crusher & Pulverizer Co.
Dept. RP5 St. Louis, Mo.**

Our 65th Year

Perlite Institute Progress Report

THE PERLITE INSTITUTE has adopted the following definitions and standards:

a) Perlite is a volcanic rock, which, when heated quickly to a suitable point in its softening range, expands to form a lightweight, non-combustible, glass-like material of cellular structure.

b) Perlite plaster aggregate consists of expanded perlite sized for use in lightweight, fire-retardant plaster. For scratch and brown coats the aggregate shall conform to the requirements of the Standard Specifications for Sand for Use in Plaster (A.S.T.M. Designation C35-39) except that the minimum percentage retained on a No. 100 (149 micron) sieve shall be decreased from 95 to 90 percent. The density shall be not less than 6 nor more than 12 lb. per cu. ft. as determined by measurements in a cubic foot box, using the shoveling procedure outlined in the Standard Method of Tests for Unit Weight of Aggregate (A.S.T.M. Designation C29-42).

c. Perlite concrete aggregate consists of expanded perlite sized for use in lightweight, fire-retardant, insulating concrete. The characteristics of the aggregate, together with the water ratio and cement proportions, shall be such as to attain desired performance properties in the concrete.

A resolution was adopted by some 24 members of the industry, requesting the American Standards Association to include perlite plaster aggregate in its Gypsum Plastering Specification A42.1-1946. This would call for the following proportions:

Base coat plaster shall be proportioned as follows:

a) Gypsum neat plaster (f) (three coat work). First (scratch) coat, on all types of lath, shall be mixed on the proportions of 100 lb. of gypsum neat plaster to not more than 2 cu. ft. of vermiculite or perlite. (g)

First coat on masonry surfaces (except monolithic concrete) and second (brown) coat in all three-coat work, shall be mixed in the proportions of 100 lb. of gypsum neat plaster to not more than 3 cu. ft. of vermiculite or perlite. (g)

b) Gypsum neat plaster (f) (two coat work). On all plastering bases except wire, metal, or wood lath and monolithic concrete, the entire base coat may be applied by the use of the double-up or lay-on method. In such an application on any plaster base except masonry, the plaster shall be mixed in proportions of 10 lb. of gypsum neat plaster to not more than 2½ cu. ft. of vermiculite or perlite. (g) When applied in the double-up method over masonry (except over monolithic concrete) the plaster shall be mixed in the proportions of 100 lb. of gypsum neat plaster to not more than 3 cu. ft. of vermiculite or perlite (g)

(f) The term "neat" as applied to gypsum plaster means that the material as shipped by the manufacturer does not contain aggregate. Aggregate must be added on the job. Neat plaster may be fibred or unfibred.

(g) Equivalent Mixes

1:2 (scratch coat)

2 (100 lb.) bags of gypsum plaster to not more than 1 (4 cu. ft.) bag of vermiculite or perlite.

1:3 (brown coat and two coats on masonry)

4 (100 lb.) bags of gypsum plaster to not more than 3 (4 cu. ft.) bags of vermiculite or perlite.

1:2½ (two coat work)

8 (100 lb.) bags of gypsum plaster to not more than 5 (4 cu. ft.) bags of vermiculite or perlite.

Most companies now are producing perlite plaster aggregate with a density range of 7½ to 10½ lb. per cu. ft. The range of 6 to 12 lb. per cu. ft. was adopted to incorporate excellent products made by several companies whose test data shows satisfactory strength properties.

Acoustical tests are being made to develop authentic information as to the passage of sound from one room to another through perlite plastered partitions. Several tests have been completed and will be released shortly, indicating that it is possible to reduce sound transmission by over 50 db. for certain types of partition construction. Great advances in economical sound absorption or sound deadening within rooms are expected from perlite acoustical aggregates. Other tests are proposed on sound absorption of perlite plaster without a hard finish. No speculative information will be issued by the Perlite Institute or its membership until it is proved by tests in recognized laboratories. The institute also is making development tests to complete the information on aggregate density, particle size, water ratio and mix ratios.

Lightweight Construction

GREAT LAKES CARBON CORP., New York, N. Y., claims that it is now considered possible to build an ideal, low cost lightweight building with a dead load to live load ratio as low as 1:1 through the use of perlite aggregate. An official of the company has stated that the ordinary building of today has a dead load to live ratio of generally 6:1. If this were reduced as low as 1:1, it would mean a saving of 80 percent in dead load. Full scale fire tests on perlite plaster in accordance with A.S.T.M. method E-119 have been made at the Underwriters' Laboratories, Bureau of Standards, and many universities. These tests have confirmed the fire-resistant qualities of perlite and have accounted for many of the applications of this product, the company states.

World-Wide Cement Developments

MINERAL TRADE NOTES reports the following developments in the cement industry throughout the world:

Argentina—Production of cement totaled 17,529,760 bags (of 110 lb. each), and deliveries totaled 17,650,078 bags in the first 9 months of 1948, compared with 20,659,940 bags produced and 20,873,490 bags delivered in the first 9 months of 1947. Cement and clinker on hand at the end of September 1948 was 2,199,342 bags. The average price per bag at the plant was \$1.25 (U. S. currency).

Colombia—A cement shortage evident in Antioquia during the early part of 1948 caused the government to freeze all stocks and curtail shipments of Antioquia cement to other Departments. The two cement plants in the Department are undergoing expansion to raise the daily output from 360 t.p.d. to 720 t.p.d., considered enough to take care of cement requirements for 5 years.

Egypt—Requirements of the Near East for cement cannot be met by present production in Egypt, Syria and Lebanon, according to the best available information. At present two cement plants are operating near Cairo, their output enough to supply Egypt's domestic needs. Combined potential annual production is 800,000 metric tons. A new company, the Alexandria Portland Cement Co., S.A.E., is building a plant near Alexandria. This is understood to be an operation of the Helwan Cement Co., a large part of whose shares are held by F. L. Smidth & Co. in Denmark through the Tunnel Cement Co. of London. Helwan Cement Co. will own about 45 to 50 percent of the shares in the proposed Alexandria plant, the rest to be sold on the market. It is believed that most of its output will be exported to Near Eastern countries, although it may supply the Alexandria district also.

The plant in Damascus is operating at about one-third of its rated capacity because of its state of disrepair, it is understood. The same is said to be true of the plant in Lebanon near Tripoli. A new plant planned for Aleppo will probably produce 300 metric tons per day.

Peru—The country's one cement plant, near Lima, supplies all domestic needs. In 1947, however, the Peruvian government drilled a large deposit of limestone near Tembladera in northern Peru and reported that this deposit contains a huge volume of limestone suitable for the manufacture of cement. A syndicate now has a lease on the deposit and plans to establish a \$2,000,000 cement plant at the port of Pacasma utilizing this deposit.

Cement output totaled 1,503,786 bbl. of 170 kilos each, valued at 19,815,151

(Continued on page 130)

Baughman

The **HI-SPEED**
Belt and Bucket Elevator
that costs less to own and cuts
your operating
expense

FOR QUARRIES . . . BLOCK
PLANTS . . . BATCH PLANTS
. . . PRE-MIX PLANTS . . .
CEMENT PLANTS . . . YARDS

Built by production line methods to slash manufacturing costs! Standard length sections and head and boot assemblies are adaptable to the requirements of any permanent or temporary installation.

Large capacity . . . heavy duty. Lifts sand, gravel, other aggregates from 20' to 80'—up to 90 tons per hour. Ruggedly built of high tensile alloy steel.



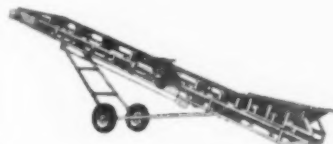
MOVE Baughman CONVEYOR TEAMS ANYWHERE!

Whatever your materials handling problem, BAUGHMAN has the answer. There are unlimited variations and combinations possible in BAUGHMAN equipment—horizontal belt conveyors to any length . . . heavy duty, light duty and inclined elevators . . . auger type and belt type conveyors adjustable to any angle. All equipment is either completely portable or easily disassembled for re-location at any time.



MODEL Q AUGER CONVEYOR

Lloads, unloads, conveys any material that becomes fluid in movement . . . from the horizontal to 60°. Volumes from 15 to 50 cu. ft. per minute depending on material conveyed. Positive direct drive, for portable or stationary installations. Available with or without wheels . . . with hopper or in combination.



MODEL 230 BELT CONVEYOR

Another "Hi-speed" product that's long on service and short on price. Pre-fabricated by assembly line methods . . . assembled from standardized units. Result: a ruggedly built conveyor you can well afford to buy. Conveyor illustrated is 30' long, composed of one 20' section, one 7' tail end and one 3' head section, from stock. Gasoline or electric power. Portable or stationary.

• WRITE for information on full line of conveyors and BAUGHMAN self-unloading bodies and spreading equipment.



BAUGHMAN MANUFACTURING CO., Inc.

961 Shipman Road

Jerseyville, Ill.

"There is a Baughman Distributor Near You"

Take a Load Off Your Mine with **NAYLOR** Light-weight PIPE



Engineers have found that Naylor Pipe simplifies many jobs in mining service. Its light weight makes it easy to handle and install. The extra strength and safety found in no other light-weight pipe give Naylor the "backbone" needed for rough and ready mining service. That's why it will pay you to specify Naylor for high and low pressure water lines, hydraulicking, high and low pressure air lines, de-watering and drainage, suction lines, sludge lines and ventilating lines. Naylor Pipe is available in sizes from 4" to 30" in diameter and thicknesses from 14 to 7 gauge. All types of fittings, connections and fabrication.

Write for Catalog No. 44.



NAYLOR PIPE COMPANY

1237 East 92nd Street, Chicago 19, Illinois
New York Office: 350 Madison Avenue, New York 17, N. Y.

soles in 1947, compared with 1,533,039 bbl. valued at 15,306,991 soles in 1946.

Poland—The newspaper Robotnik on September 15, 1948 printed an item that the delivery to Poland of Soviet equipment for a cement factory at Strzelce, near Opole, was being discussed. The new cement plant is expected to have an annual production capacity of 350,000 tons. The press estimates that the investment will increase Polish cement output capacity by one-third of the present volume. Official statistics also show that Poland exported 416,000 tons of cement in 1947 and 143,400 tons during the first 5 months of 1948 (when 700,000 tons were produced).

Saudi Arabia—It is understood that the erection of a cement plant in Saudi Arabia is being considered. The plant would supply ordinary construction cement as well as special cement for oil work, production of which would be about 600 metric t.p.d.

Sweden—Cement production in Sweden is expected to increase in 1949 to about 2,000,000 metric tons owing to the completion of a new plant at the end of 1948 that will increase the national total output by more than 20 percent. Government controls on the manufacture and sale of cement, maintained since 1941, were removed October 1, 1948, as it is expected that 1949 output will meet consumption requirements (estimated at 1,600,000 tons in 1947). Sales of domestic cement will continue to be rationed to consumers, however, since it is considered desirable to take advantage of the current favorable export opportunities, especially in Central and South America. During the years immediately preceding the war, Sweden exported an annual average of about 40,000 metric tons of cement, mainly to Central and South America. Exports since 1940 have been negligible, however.

The Swedish press of October 2, 1948, carried an article stating that Sweden is now in a position to export 100,000 tons of cement in 1948 and up to 400,000 tons during 1949 without any detrimental effect upon domestic supplies.

Abrasion Test Methods

AMERICAN ROAD BUILDERS ASSOCIATION, technical bulletin 121, lists 29 states using the Los Angeles Rattler test exclusively for aggregate hardness determination; 11 states use the Duval test exclusively; two states use both tests and one state uses a modified form of the Duval test.

Association Moves Offices

OHIO SAND AND GRAVEL ASSOCIATION has moved from the Majestic Building to Room 630, Huntington Bank Building, Columbus. Claude L. Clark is executive secretary.

Manufacturers' News

Lincoln Electric Co., Cleveland, Ohio, has announced the following additions to the sales engineering staff: J. W. Brooks is welding engineer in the Boston area; J. J. Chemerys is serving industrial accounts in the Syracuse territory; W. R. Karl has assumed sales and engineering responsibilities in Newark, N. J.; and R. G. Todd has joined the welding engineering staff at Tulsa, Okla.

Fairbanks, Morse & Co., Chicago, Ill., announces that O. O. Lewis has been elected vice-president in charge of sales, and F. J. Heaslip, vice-president in charge of purchases and traffic. Mr. Lewis joined the company in 1908 as a clerk. For a number of years he was a sales engineer in the Indiana, Ohio and Michigan area. In 1932 he



F. J. Heaslip

was appointed manager of the Atlanta branch house, which position he held until 1943 when he was transferred to Chicago and appointed assistant sales manager. Five years later he was promoted to sales manager. He has also been elected a director of the company. Mr. Heaslip became associated with the company in 1927 as a buyer in the purchasing department. He was made purchasing agent in 1935 and director of purchases in 1942. He has been a director for several years.



O. O. Lewis

Eriez Mfg. Co., Erie, Penn., has appointed Arlo Israelson as chief engineer to succeed Wallace W. Mojdén who has joined the Eriez distributor, Mills-Winfield Co., Chicago, Ill., as sales engineer.

Federal Motor Truck Co., Detroit, Mich., has appointed Charles A. Phillips as factory sales representative in Colorado, New Mexico and southern Wyoming with headquarters in Denver. H. P. Hart has been named factory sales representative in eastern Pennsylvania and Delaware.

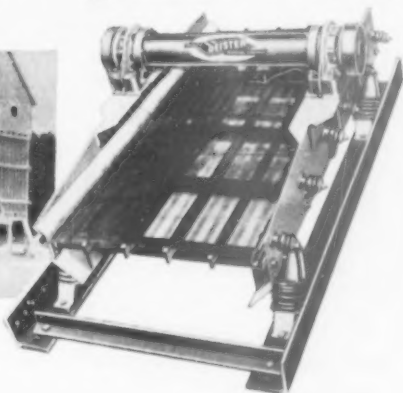
Raybestos-Manhattan, Inc., Passaic, N. J., has moved its New York offices, which include the New York and New England district office of the Manhattan Rubber Div., and the Corporation Export Department including Allied Asbestos & Rubber Co. (Export) Inc., to 500 Fifth Avenue, New York, N. Y. The department of marketing and merchandising has been moved to the executive headquarters at 61 Willett

1st

Production report on New Deister Ag-Lime Screen



SIDWELL BROTHERS PLANT



One year ago, we released one of our new Ag-Lime Screens for production tests to Sidwell Brothers, Deavertown, Ohio. It performed so well that a second screen was added later.

Carl Sidwell sums up the exceptional allround performance of the Ag-Lime Screen this way:

"As you know this is a very hard stone to screen. You really helped to solve our problem when you came out with this light-weight, steep-incline and high-speed screen. They are doing a very good job."

Both of the revolutionary Ag-Lime Screens at Sidwell are equipped with $\frac{1}{8}$ " square opening cloth and .041" diameter wire. Screen Number One is fed 30 tons an hour, with 10 tons going through.

Moisture content is $1\frac{1}{2}$ to 4%. Largest particle in feed is 1 inch.

Ag-Lime Screen Number Two receives 35 tons an hour, with 15 tons going through. Moisture content is $\frac{1}{2}$ to $1\frac{1}{2}\%$. Screen cloths last an average of five months.

This is high-capacity handling and accurate sizing of damp sticky materials without blinding. The new Deister Ag-Lime is revolutionary: lighter in weight, operates on a far faster stroke cycle — especially designed to handle ag-lime and other damp fines. The experience of Sidwell Brothers is proof enough that for economical screening of agricultural limestone, you can't beat the new Deister Ag-Lime Screen.

For particulars, write for Bulletin No. 51 today.



DEISTER MACHINE COMPANY
FORT WAYNE 4, INDIANA

STEEL

Every Kind

Quick Delivery

Plates, Structural,

Bars, Sheets, Tubes, etc.

Carbon, Alloy, Stainless

Steels, Babbitt Metal.

RYERSON

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco

St. Passaic, N. J., with Franklin A. Miller continuing as director of marketing and merchandising and J. W. Brush, Jr., as assistant.

B. F. Goodrich Co., Akron, Ohio, announces that Raymond H. Blanchard has been elected president of the Hood Rubber Co., Watertown, Mass., a division of the company. He was formerly vice-president and succeeds the late C. Lawrence Münch.

Macwhyte Co., Kenosha, Wis., announces that James A. Cowan has been transferred to Pittsburgh, Penn., as direct factory representative. His territory will be in Pennsylvania and New York.

Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, Ohio, has appointed Howard H. Sprinkle as assistant sales manager of the division. He has been with the company since 1923, starting in the order and billing department. He was later transferred to the sales department and since 1933 has been sales representative in the Cleveland and Buffalo areas.

Kochring Co., Milwaukee, Wis., has announced the appointment of The Rowen-Leahy Co., Hartford, Conn., as distributor in Massachusetts and Connecticut, and the Lou Garris Equipment Co., Birmingham, Ala., as distributor in Alabama and northwestern Florida. The Empire Equipment Co., has opened a new distributor branch office in Aberdeen, S. D., and the Moore Equipment Co., Inc., Stockton,

**You're Sure
with Merrick**



**FOR Positive Controlled
Feed by Weight of Sand
Gravel, Lime Clinker,
Gypsum or other materials
to Process—**

Use the Feedometer

**Merrick Scale Mfg. Co.
Passaic, New Jersey**



HAMMOND Multi-Wall BAGS

SEWN • PASTED • OPEN MOUTH • VALVE STYLE

... safeguard your products
against rain, snow, sleet or sun
because they're weather-proof. Special
moisture-proof plies are used for products
requiring extra protection.

Write for quotation on your needs!



HAMMOND BAG & PAPER CO.

GENERAL OFFICES: WELLSBURG, W. VA.

Plants in Wellsburg, W. Va., and Pine Bluff, Ark.

Calif., has a new distributor branch office in North Sacramento, Calif. W. W. Williams Co., Columbus, Ohio, has opened a branch office in Maumee, Ohio.

Union Wire Rope Corp., Kansas City, Mo., has established offices and warehouses at 155 Howell St., Dallas, Texas, and at 903 Del Paso Blvd., North Sacramento, Calif., making a total of 12 branches serving as distribution links between factory distributors and users of its equipment.

Fuller Co., Catasauqua, Penn., announces that the Main Engineering Co., Pittsburgh, Penn., which for many years represented the company in western Pennsylvania and West Virginia, has been appointed representative in the State of Ohio. The company has also been assigned to Ohio, West Virginia and western Pennsylvania by the Marietta Concrete Corp., for the sale of its concrete stove silos.

The Colorado Fuel & Iron Corp., Denver, Colo., has elected F. S. Jones as vice-president in charge of sales. He succeeds Newell H. Orr who has retired but will serve in an advisory capacity. James N. Counter, formerly Rocky Mountain division sales manager, has been named to succeed Mr. Jones as general manager of commercial steel sales of the Western division.

Arkell & Smiths, New York, N. Y., has announced the promotion of T. L. Jones to Central division sales manager, including Michigan, Indiana, Ohio, western Pennsylvania, West Virginia, southern Illinois and Kentucky. He will continue to maintain headquarters at Columbus, Ohio.

Western Machinery Co., San Francisco, Calif., has announced the consolidation of the Western-Knapp Engineering Division with the manufacturing division, creating a new organization to be known as the Wemco Division. Ralph B. Utt, formerly general sales manager, has been named general manager of the new division.

Atlas Powder Co., Wilmington, Del., has appointed James R. Russell as special representative in the explosives department of the New York district, which comprises New England, New Jersey and Delaware, as well as parts of Pennsylvania, Maryland, Virginia and West Virginia. He was formerly explosives sales representative in the San Francisco district.

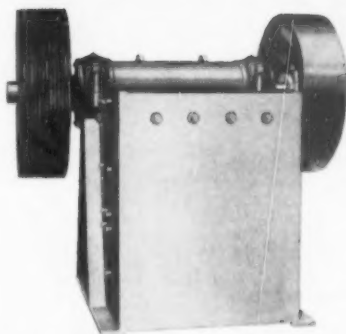
Flexible Tubing Corp., Branford, Conn., announces that Wesley L. Guiles, development engineer, who has returned from Alaska and his duties as representative at the U. S. Air Force winter maneuvers, has been appointed technical representative. Jack F. Chapin has been named to succeed Mr. Guiles as development engineer in charge of product and process engineering.

Ledeen Mfg. Co., Los Angeles, Calif., announces that Alexander To-

(Continued on page 158)

ROGERS

**BETTER ROCK PRODUCTS
BY STAGED REDUCTION**



**Get More
For Your Money
with a
ROGERS
JAW
CRUSHER**

- Greater Capacity
- Less Maintenance
- 18 Sizes

Extra tons of reliable production — that's what you get from a Rogers Jaw Crusher. Special long jaws really chew up the boulders; 6 primary, 12 secondary sizes up to 32 x 40-in. Husky, oversize shaft and bearings keep them rolling with little or no maintenance.

There is no substitute for *staged reduction* — Rogers coordinated equipment always gives you the quantity you need in the size you need. Write today for specifications.



ROGERS IRON WORKS CO.

JOPLIN, MISSOURI



MANGANESE STEEL CASTINGS---ALLOYED! THE ANSWER TO YOUR wear PROBLEM

We supply 10% to 14% Manganese Steel with special additions of alloys to produce either additional hardness or ductility to permit the parts to better meet severe operating conditions. If your problems include one of finding the proper metal for an application where the going is tough, get in touch with us.

KENSINGTON STEEL COMPANY

504 Kensington Avenue

Chicago 28, Illinois

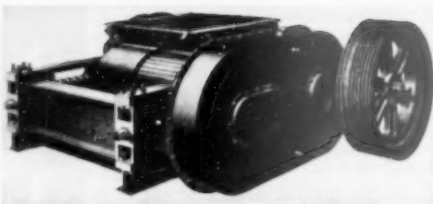
COMPARE

before you buy

COMPARE

the **BONUS PRODUCTION** offered by

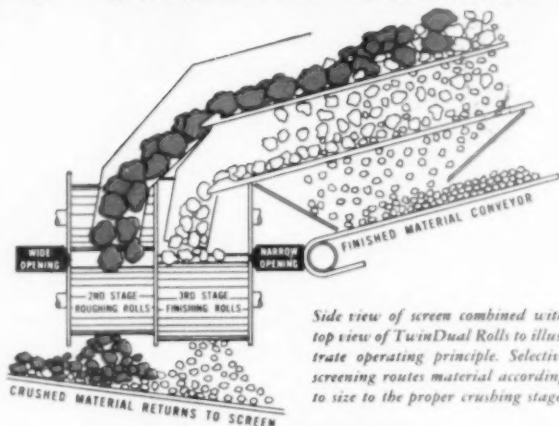
UNIVERSAL'S EXCLUSIVE TWIN DUAL METHOD



TWIN DUAL ROLL CRUSHER
Two sets of double rolls in a single machine

Get all these advantages with the
TWIN DUAL Method in Rock and Gravel Plants

- 1 Three Full Stages of Reduction . . .
First stage—Jaw Crusher
Second and Third stages—TwinDual Rolls
- 2 TwinDual Rolls are in effect two roll crushers, yet save weight and space required by two separate units.
- 3 Wide feed opening of Second Stage (see illustration) permits up to 100% wider jaw crusher discharge opening. This provides better angle of nip, doubles jaw capacity, greatly reduces jaw wear and results in faster discharge of material from jaw crusher—no clogging.
- 4 30% to 50% of material entering Second Stage is reduced to finished size and does not require reduction by the Third Stage.
- 5 Finished material removed before and after each of the three crushing stages increases production. Selective screening routes oversize to the proper crusher.
- 6 No material enters any crusher unless crushing by that stage is required. Capacity is increased because crushers are not burdened with unnecessary material—roll shells and jaws last longer.



Side view of screen combined with top view of TwinDual Rolls to illustrate operating principle. Selective screening routes material according to size to the proper crushing stage.

PORTABLE and STATIONARY TWIN DUAL Plants Available for Rock and Gravel

Tried and proved by more than 10 years of successful operation in the field, TwinDual owners report high production with low operating and maintenance costs. Feature for feature, capacity for capacity, weight for weight, compare Universal TwinDual Plants with the field. Get all the facts now.

Write for complete information

Universal builds a variety of "Right Combinations" of crushing, screening, washing and conveying equipment for rock, gravel and aglime.

UNIVERSAL ENGINEERING CORP., Division of PETTIBONE MULLIKEN CORP.

617 C Avenue N.W., Cedar Rapids, Iowa
Phone 7105

4700 W. Division St., Chicago 51, Ill.
Phone SP aulding 2-9300



INFORMATION

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

- 1 CHAINS**—Beaumont Birch Co. Catalog 10-B describes and illustrates newly designed elevator chains, buckets and traction wheels made of "Beaucalloy," a heat-treated alloy steel that is said to handle the most abrasive of materials. Working loads, capacities and dimensions are also given.
- 2 CONDENSERS**—Condenser Service & Engineering Co., Inc. Bulletin 441-C describes and illustrates various types of condensers and accessories. Typical installations, cutaway views, tube data, pressure and temperature conversion tables and construction details are given.
- 3 CONTROL PANELS**—The Mays Corp. has released an 8-page booklet, Bulletin 773, describing and illustrating various sizes, shapes and designs of instrument and control panels. Operations of fabrication are discussed such as layout, cutting, drilling, welding, fitting, painting, wiring, etc. also features like electric clocks, pressure gages, transformers, name plates, push-button stations, and signal lights.
- 4 CONTROL UNIT**—Kay-Brunner Steel Products, Inc. has issued Bulletin 366-ED, describing and illustrating a hydraulic control unit that is adaptable to all models of all crawler tractors. It consists of pump, valves and tank in one unit. Complete specifications and prices are contained in the bulletin.
- 5 CONVEYOR BELTING**—Carlyle Rubber Co., Inc. has issued a 12-page booklet on the installation, care and maintenance of rubber conveyor belting.
- 6 CONVEYORS**—Barber-Greene Co. Bulletin No. 4901 describes and illustrates typical installations of the B-G belt car unloader and portable conveyor at ready-mixed concrete, cement, and crushed stone plants.
- 7 CRUSHERS**—American Pulverizer Co. has released an 8-page bulletin, No. 147, describing and illustrating the operation of the ACS, 30 Series, and 24 Series crushers. Construction features, diagrams, capacities and ratings, dimensional data and typical installations are included.
- 8 CYLINDERS**—Ledeen Mfg. Co. has published technical bulletin CS-949, illustrating the use of pneumatic actuating cylinders to provide nearly automatic operation of a concrete block machine. Bulletin 483 giving dimensions, capacities, weights, applications, and other engineering data is also available.
- 9 DIESELS**—Cummins Engine Co., Inc. has released Bulletin 5291 containing complete specifications of all automotive and industrial models of the HR-400 diesels, which are said to develop a maximum of 100 hp. at 1800 r.p.m. and are available in six models.
- 10 DRILLS**—Joy Mfg. Co. has issued a 10-page bulletin, No. M-207, describing and illustrating various types of quarry drills for open pit crushed stone quarries, such as rotary blast-hole and crawler mounted drills, wagon drills, hydro drill jibs, rock and core drills, breakers. Rock bits, hoists, spaders and compressors are also described and illustrated.
- 11 DRIVES**—Allis-Chalmers Mfg. Co. has published a 4-page inventory survey check list for V-belt drives with suggestions to help users determine exact condition of the drives and sheaves.
- 12 DUST COLLECTORS**—The Ducon Co. has announced a 12-page catalog DC-49-48, describing and illustrating Ducon collectors for industrial dust control and recovery. Construction and operating features, schematic drawings, etc., are included.
- 13 EJECTORS**—Condenser Service & Engineering Co., Inc. has released a 12-page bulletin describing and illustrating steam jet air ejectors for removing air from condensers. Engineering data, temperature and pressure conversion tables, cutaway view of basic ejector assembly, accessories and charts are also shown.
- 14 FEEDERS**—Syntro Co. has published a 16-page bulletin, describing and illustrating various types of vibratory feeders with variable control of rate of flow. Types shown are "Vibra-Flow," long conveyor models, multiple magnet models, furnace feeders, infra-red dry feeders, etc.
- 15 GENERATORS**—Edge Moor Iron Works, Inc. has released Bulletin G-491, describing and illustrating Gems automatic steam generators, ranging in size from 20 to 500 h.p. (700 to 17,000 lb. of steam per hour) and in design pressure from 15 to 200 p.s.i. Specifications and dimensions, cutaway view and diagram of generator are included.
- 16 HOISTS**—American Hoist & Derrick Co. has released Catalog No. 100H-55, describing and illustrating Models 55, 75 and 100 hoists ranging from 5500 to 10,000 lb. single line pull and 50 to 100 hp.
- 17 LIFT TRUCKS**—Hyster Co., has released an 8-page catalog, No. 1135, describing and illustrating the redesigned and improved Model 20 lift truck of 2000 lb. capacity. Specifications, construction details and action pictures are included.
- 18 LIFT TRUCKS**—Lewis-Shepard Products, Inc. Bulletin No. 26 covers complete information on hand lift trucks and Weld-
- master skid platforms, in capacities from 500 to 15,000 lb. and more. Installation photographs, specifications, engineering features and construction details are shown.
- 19 LOCOMOTIVES**—General Electric Co. has announced a 16-page bulletin, GE-3801A, describing and illustrating the 80-ton diesel-electric locomotive for industrial switching.
- 20 LOG WASHERS**—McLanahan & Stone Corp. has released 8-page Bulletin WLO-849 on steel log washers for removing tough clay and soft rock from sand, gravel, rock and ores. Log capacities range from 25 to 200 tons per hr., and log speeds, from 12 to 80 r.p.m. Size of feeds can vary from fines up to 4-in. square. Specifications, dimensional charts and cross-section diagrams are also given.
- 21 MATERIALS HANDLING**—Aerol Co., Inc. has published a materials handling manual that answers many of the problems being faced by users of materials handling equipment. Dimensions, load ratings, compensation tables and conversion charts are included.
- 22 MIXERS**—Chain Belt Co. has published Bulletin 50-10, describing and illustrating the Rex Horizontal Moto-Mixer and the new Rex Adjusta-Hite Discharge Moto-Mixer. Cutaway views, job pictures and dimensional drawings, specifications and mounting dimensions for all sizes, are also given.
- 23 MOTORS**—Allis-Chalmers Mfg. Co. has released an 8-page bulletin, No. 51B6210B, describing the design and construction features of the "Safety-Circle" motor, which consists of a heavy cast iron frame surrounding all working parts of the motor. Motors are available in sizes from 1 hp. at 1800 r.p.m. to 20 hp. at 3600 r.p.m., in frames 328 and smaller. All dimensions are N.E.M.A. standards.

Fill Out Reverse Side—MAIL TODAY

FIRST CLASS
PERMIT NO. 1417
Sec. 34.9, P.L.&R.
CHICAGO, ILL.

BUSINESS REPLY CARD

No Postage Stamp Necessary If Mailed in the United States

—POSTAGE WILL BE PAID BY—

ROCK PRODUCTS

309 WEST JACKSON BOULEVARD

CHICAGO 6, ILL.

FREE!

Information on

NEW LITERATURE about your business

USE
COUPON
BELOW

24 NAILS—Wheeling Steel Corp. has released a 12-page bulletin, Form 407-B, giving reports of tests conducted by the Pittsburgh Testing Laboratory on hardened cut steel nails for use in concrete block construction. Tests indicate that hardened cut steel nails are superior to common wire nails for securing wood attachments to concrete block.

25 OIL BURNERS—Hauach Mfg. Co. has issued Catalog No. 410, describing and illustrating proportioning oil burners for automatic combustion control. Charts, diagrammatic drawings showing arrangement of automatic control systems, levers and connectors, capacities, dimensions and typical installations are also shown.

26 PAINT—Speco, Inc. has issued an application bulletin on Rustrem, an anti-rust paint which it is said can be applied over paint without wire brushing or scraping.

27 PLASTERING—National Foundation for Lathing and Plastering, Inc., 173 W. Madison St., Chicago 2, Ill., has released the second edition of its Handbook of Recommended Specifications for Lathing, Furring and Plastering. Among subjects discussed are materials, grounds, application of lath, partition details, furred walls, ceiling details, thicknesses and proportions, mixing, application of base and finish coats, etc. Copies may be obtained from Foundation for 50¢ each.

28 FULLEYS—Reeves Pulley Co. has announced an 8-page bulletin, VN-4912, describing and illustrating the improved Vari-Speed Jr. motor pulley for light horsepower requirements. Rating and dimension tables are included.

29 PULLEYS—Sprout, Waldron & Co., Inc., has issued Bulletin 33, describing and illustrating complete line of "Blue-Face" cast iron pulleys, furnished in diameter sizes from 6 in. to 40 in. Specifications, weights, price list, etc., are included. Supplementary Bulletin 35 carries testimonials from users of the "Belt-Saver" tail pulley on bucket elevators and belt conveyors.

30 PUMPS—Condenser Service & Engineering Co., Inc. has announced Catalog 1, describing and illustrating various types of centrifugal and piston pumps. Cross-sectional diagrams, specifications, operating data, construction features, mounting diagrams, charts, are included.

31 PUMPS—Nagle Pumps has released a 36-page catalog, No. 4906, describing and illustrating various types of industrial pumps for abrasive applications and priming indicators. Also described and shown are the Type SW-OB vertical shaft pumps for handling mixtures containing quick settling solids. Specifications, priming data, diagrams, cross-section drawings, and typical applications are included.

32 PUMPS—Thomas Foundries, Inc. has issued Bulletin TD-100, describing and illustrating dredge pumps for use in pumping sand and gravel, ashes and clinker, etc. Construction details, typical applications, and cross-sectional diagrams are given.

33 RECORDERS—Bailey Meter Co. announces Bulletin 150-A which describes and illustrates design improvements and new applications for the combustibles recorder which gives a continuous graphic record of combustibles content of a gaseous mixture. Construction features, charts, diagrams and typical applications to rotary kilns, boiler furnaces, atmosphere producers, industrial furnaces, and chemical processes are given.

34 REINFORCING BARS—Joseph T. Ryerson & Son, Inc. has issued an 8-page bulletin describing a specialized steel service for contractors featuring Hi-Bond reinforcing bars that are said to give greater bond between steel and concrete.

35 SCALES—Denver Equipment Co. has brought out two bulletins on pulp density scales. Bulletin S1CB covers pulps ranging from 5 percent solids at specific gravity 1.40 through pulps of 65 percent solids at specific gravity 3.20. Bulletin S1CB1 covers the low-range specific gravity pulps from 5 percent solids at specific gravity 1.35 through pulps

of 65 percent solids at specific gravity 1.85. Tables, pulp density formulas and charts are included.

36 SCALPERS—Robins Conveyors Div., Hewitt-Robins, Inc. Bulletin No. 131 describes and illustrates a heavy-duty scalper which is said to scalp off lumps of solid rock as big as 5' x 5' x 5-ft. and weighing 1½ tons or more a piece. Construction features are given.

37 SHOVEL-CRANE—Link-Belt Speeder Corp. has announced Catalog No. 2322 describing and illustrating the HC-51 truck-mounted shovel-crane with Speed-o-matic hydraulic controls. Typical applications, construction details and specifications are also given.

38 SPEED REDUCERS—The Cleveland Worm & Gear Co. has issued an 8-page bulletin, No. 125, describing and illustrating Type ND and Type NU vertical speed reducers for agitators and mixers. Dimensional data, cross-sectional drawings, thrust and overhung load capacity charts are also given. Types NU and ND speed reducers are available in seven sizes each.

39 SPEED REDUCERS—Dodge Mfg. Corp. has released a 16-page brochure, Bulletin A-470, describing and illustrating the new Torque-Arm speed reducer, made in six sizes ranging in capacities to cover a wide range of drives up to 25 hp. Full-size photos, selection tables, diagram and price list are included.

40 SPEED REDUCERS—The Falk Corp. has issued Bulletin 1110 containing engineering data on parallel shaft sleeve bearing speed reducers, which supersedes all previous material issued on parallel shaft sleeve bearing units.

41 SPROCKETS—Chain Belt Co. Bulletin 49-30 describes and illustrates Rex stock size cast sprockets for drive and conveyor chains. Dimensions, specifications, list prices, rules for selection, alignment and care of sprockets are included.

42 STORAGE BATTERIES—Gould Storage Battery Corp. has released a revised second edition of the 40-page pocket-size handbook of technical instructions and engineering data on the care of motive-power storage batteries. A new 4-page section on the theory of the lead-acid battery is included. Other sections cover care and operation; maintenance and repairs; parts; and technical data. Photographs and charts are also shown.

43 THAWING PITS—Hauach Mfg. Co. has released Bulletin 1040, describing and illustrating thawing pits, an indirect radiant heating method for thawing limestone cars coming from quarries and for heating coal hoppers.

44 TRUCKS—Euclid Road Machinery Co. has issued Form No. 250, describing and illustrating the Model FDT bottom-dump truck with a truck capacity of 13 cu. yd. and a payload capacity of 20 tons. Powered by diesel engine of 190 or 200 hp., truck has speeds ranging up to 35 m.p.h.

45 VIBRATING SCREENS—Deister Machine Co. has released a 20-page booklet, Bulletin No. 50, describing and illustrating vibrating screens for various types of sizing and scalping operations. Mechanical features, screen sizes, production capacity and service for applications such as sand, gravel, stone, coal, haydite and hot mix asphalt, are also given.

Detach and Send Us This Post Card

(6-50)

ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago, Ill.

I would like to have the items circled.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45					

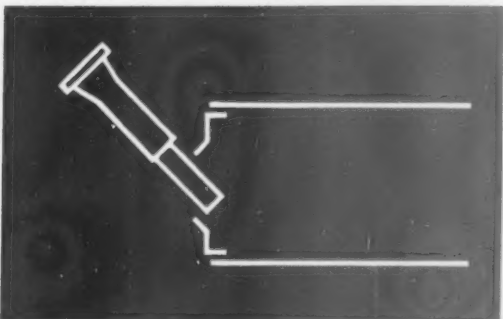
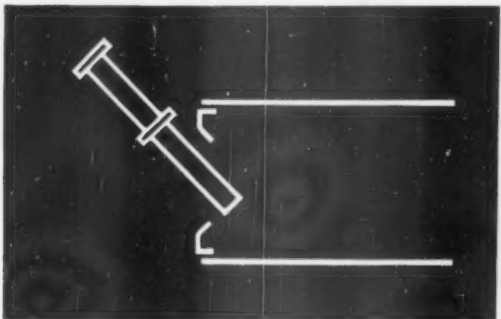
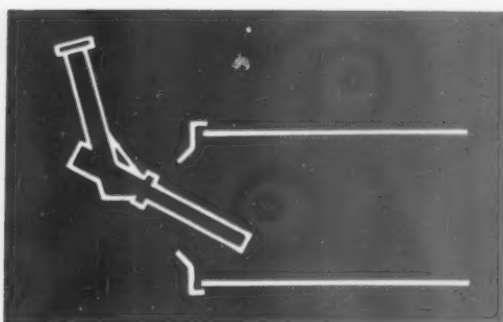
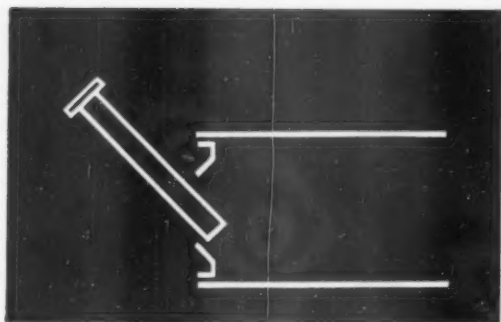
(Please print or typewrite name and address)

Name

Company

Street

City & State



THERMALLOY* Feed Ends and Feed Pipes are *EASY TO INSTALL*



Thermalloy "40" kiln
feed end of segmented
cone design.



Thermalloy "50"
feed pipe section
flanged on
each end.

Thermalloy feed pipe
assembly of unique
"angled" design.

The diagrams above show some of the many ways in which Thermalloy feed ends and feed pipes can be adapted to your kiln requirements.

No special "built-up" brick feed ends are necessary, thus reducing installation costs. The segmental design of Thermalloy feed ends prevents cracking due to expansion and contraction. And Thermalloy feed ends have lasted up to 10 times as long as "bricked-up" ends.

With the many different designs of Thermalloy feed pipes and feed ends available, an Electro-Alloys engineer can help you choose the type best adapted to your requirements—for easiest installation and maximum service life.

Call your nearest Electro-Alloys office, or write Electro-Alloys Division, 2017 Taylor St., Elyria, Ohio.

*Reg. U. S. Pat. Off.

Specify **THERMALLOY*** for heat and abrasion resistance
... **CHEMALLOY*** for corrosion resistance

AMERICAN

Brake Shoe

COMPANY

ELECTRO-ALLOYS DIVISION
ELYRIA, OHIO

**Doing TOUGH drilling fast
takes the speed and stamina of
ROK-BITS
CROWN CARBIDES**

Crown cutting affords faster drilling than you have ever experienced. And in other ways Rok-Bits are engineered to better your footage at less cost. Note how air holes are placed for better blowing—the self-cleaning chip channels—the threads designed especially to match this bit's outstanding performance. Check your present bit performance against Rok-Bits. Request folder. Rock Bit Sales & Service Co., 2514 East Cumberland St., Philadelphia 25, Pa. Branch: Ashville, N. C. A complete line of pneumatic tool accessories.

ROK-BIT—the only carbide bit with crown cutting edge



Cleveland VIBRATING SCREEN SECTIONS

Extra tonnage from replacement vibrating screen sections means extra profits. More volume per section can be obtained from Cleveland Wire Screens because they are made of production tempered abrasion resisting steel—accurately woven. This steel is tough but ductile—designed to withstand the shattering action, day-in and day-out, of high tonnage vibrating units. Install a Cleveland Vibrating Screen Section now—and PROVE the difference.

We offer complete facilities for stamping, forming, crimping, rolling, soldering, welding and furnishing wire cloth in any form to meet specific requirements.

Write for Bulletin No. 6, illustrating types of hooked edges available for your vibrating equipment.

There's a CLEVELAND WIRE SCREEN for every purpose

THE CLEVELAND WIRE CLOTH & MFG. CO.
3576 E. 78th STREET • CLEVELAND 5, OHIO

ben has rejoined the company and will take an active part in the sales and application design of hydraulic and pneumatic actuating cylinders, as well as other equipment. He will also aid in introducing the new medium duty cylinder recently added to the Ledeen line.

Foster D. Snell, Inc., New York, N. Y., industrial consultants in the fields of chemistry, bacteriology and engineering, has announced the purchase of the laboratories of the G. C. Suplee Research Corp., Bainbridge, N. Y.

Lull Mfg. Co., Minneapolis, Minn., has announced the appointment of Herbert C. Lull as sales manager. He will direct the sales promotion of all products manufactured by the company and supervise the work of its sales representatives. Mr. Lull has been associated with the heavy equipment business for many years. He was district manager in the Chicago area in the truck and coach division of General Motors Corp. prior to joining the Lull Mfg. Co. During World War II, he served in the Ordnance Division of the U. S. Army Air Corps. Prior to this, he was in the sales division of the St. Paul Hydraulic Hoist Company.



Herbert C. Lull

Hewitt-Robins, Inc., New York, N. Y., announces that Harold Von Thaden, vice-president of the company and general manager of Robins Engineers Division, recently gave a talk on "Progress by Belt Conveyors" before the Engineering Society of Buffalo, Inc., Buffalo, N. Y.

Link-Belt Co., Chicago, Ill., announces that H. Walter Regensburger has been appointed chief engineer of the general engineering department which has been transferred to Chicago. He succeeds Harry L. Strube who has retired after 24 years of service with the company. Charles M. Young, Jr., has been appointed chief developmental engineer, and Harold F. Watson has been named chief standards engineer. Announcement has also been made of the opening of a factory branch store and warehouse in Kansas City, Mo.

Buell Engineering Co., New York, N. Y., has acquired the rights to manufacture and sell the Swedish "SF" electrical dust precipitator in this country, from Svenska Flaktfabriken, subsidiary of ASEA (Swedish General Electric Co.). Though the "SF" precipitator is new to this country, it has been sold in world markets for 18 years. One hundred fifty installations are now being operated in 11 countries, on all types of valuable and nuisance dusts.

Gould Storage Battery Corp., Trenton, N. J., announces the appointment

of F. A. Miller as manager of the Northeast region, which comprises northern New Jersey, eastern New York and New England. Mal Janis, who has been representative in the New York City area for the past seven years, succeeds Mr. Miller as manager of the New York district.

Whiting Corp., Harvey, Ill., has taken over the belt and chain conveyor business formerly operated as the Curn-Foster Conveyor Co., Chicago, Ill.

Olin Industries, Inc., New Haven, Conn., announces that George F. Frost, Alton, Ill., has been appointed manager of the newly-created products service division of Winchester Repeating Arms Co., a division of the company.

The Thew Shovel Co., Lorain, Ohio, has announced the appointment of W. J. Allaback as production manager. He was formerly in charge of the planning department for Plant No. 1, of the standards department, of tool design and of warehousing. Prior to that he was head of the planning department for the TL division.

Gould Storage Battery Corp., Trenton, N. J., has promoted K. A. Vaughan, manager field engineering, to the position of manager sales engineering. His duties will include supervision of field engineers and service stations, also the coordination of all matters pertaining to quotations, inquiries and negotiations at sales headquarters. He has been associated with the company since 1928.

Eriez Mfg. Co., Erie, Penn., has appointed Dick Dietrich, San Francisco, Calif., as West Coast textile sales agent for permanent magnetic separators.

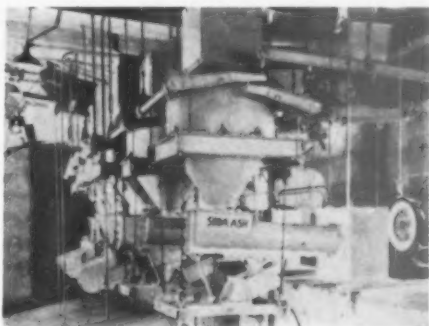
Mack Trucks, Inc., New York, N. Y., has announced the election of F. S. Nickerson as vice-president of Mack International Motor Truck Corp. and his appointment as manager of the Central Division sales territory. Mr. Nickerson has been active in the truck field since 1923, joining Mack Trucks in



F. S. Nickerson

1945 as sales representative in the Atlantic Division. The following year he was appointed manager of the Baltimore, Md., direct factory branch, a post he relinquishes to take up his new duties. Mr. Nickerson will make his headquarters in the Chicago office.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has elected Walter Geist to his ninth term as president of the company, and re-elected all other officers and directors of the firm. R. D. Moody, manager of the San Francisco district, has been named manager of the Los Angeles district, succeeding C. W. Schweers who has been appointed



SYNTRON

"Automatic"

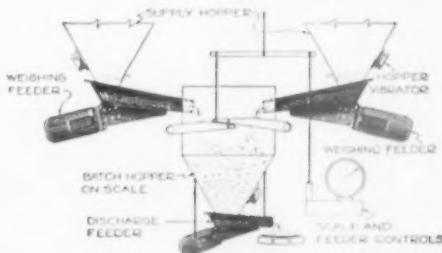
BATCH WEIGHING

Provides ACCURACY OF BATCH
SIMPLE CONTROL
SELECTIVITY

SYNTRON Vibratory Feeders inter-locked with scale control permit the handling of any one, or a combination of any materials to be accurately and automatically batched at the same time.

What is your problem? Write us about it.

SYNTRON CO., 450 Lexington, Homer City, Pa.



LONGER PRODUCING LIFE BUILT INTO FARREL-BACON CRUSHERS

Permanent strength and operating efficiency is engineered into these crushers at every vital point. Farrel-Bacon will provide industrial units or completely designed and equipped plants, including screens, elevators and conveyors. Also other types of mine, quarry, sand and gravel plant machinery. Write for complete information.

FARREL-BACON
ANSONIA, CONNECTICUT



YOU CAN DEPEND ON TY-ROCK SCREENS BALANCED RUGGED



4' x 12', two surface
Type F-600 Ty-Rock Screen

THE W. S. TYLER COMPANY CLEVELAND 14, OHIO

Manufacturers of Woven Wire Screens and Screening Machinery



PYRASTEEL

PYRASTEEL's amazing record of service is demonstrated by the old type Kiln Ring, shown at left, which withstood high temperatures in a large cement plant in Dallas, Texas, for over 14 years.

This solid ring casting, recently scrapped, weighed 4200 lbs. Today's segmented type Kiln End of the same size would save at least one ton in weight, and about \$1000 in cost.



Over 76% of the annual cement output is produced in plants that now are using either or both of our alloys, PYRASTEEL and EVANSTEEL.

Durable PYRASTEEL Kiln Ends enable modern cement plants to avoid costly burnouts and shutdowns.

PYRASTEEL is economically adapted for many other high-heat applications, including conveyor screws, clinker coolers, feed pipes, and drag chains.

Write for PYRASTEEL Bulletin

Chicago Steel Foundry Co.

Kedzie Ave. & 57th St., Chicago 32, Ill.
Makers of Alloy Steel for Over 40 Years

We invite You to visit our
BOOTH No. 2003
at the
CHICAGO METAL SHOW
October 23-27

ed manager of the New England region with headquarters in Boston. James A. Longley, Jr., sales representative in San Francisco, succeeds Mr. Moody as manager of the San Francisco office. Otho V. Tally has been named manager of the Midwest region, succeeding Benjamin F. Bilsland who has retired after more than 30 years of service. Mr. Tally was formerly manager of the St. Louis district. He has been succeeded by Baldwin G. Witty, formerly a sales representative in the Chicago office.

Sterling Electric Motors, Inc., New York, N. Y., and Los Angeles, Calif., has announced the election of Carl E. Johnson as chairman of the board.



Carl E. Johnson, left, and Earl Mendenhall

Earl Mendenhall, who has been associated with Mr. Johnson for over 34 years, has been named to succeed Mr. Johnson as president of the company. Mr. Johnson, who has been actively interested in the design and manufacture of electric motors and power drives since 1907, will devote his time to the further development and improvement of these drives. Mr. Mendenhall became associated with Mr. Johnson in 1916, and together they have been granted about 200 patents in the field of electric power drives. He will devote his time to the further development and expansion of the company's manufacturing operations, and engineering and sales offices.

Continental Gin Co., Birmingham, Ala., has opened an office at 220 E. 42nd St., New York, N. Y., to handle domestic and export activities of the industrial division in the East. Mr. A. Walter Gotta has been named district manager.

General Electric Co., Schenectady, N. Y., has appointed Robert B. Moore as manager of the mining division of the industrial engineering divisions. He succeeds R. S. Sage, who plans to retire later this year. P. A. McTerney has been appointed administrative assistant to J. M. Crawford, manager of the large motor and generator divisions. S. V. Travis has been named to succeed Mr. McTerney as manager of sales and L. H. Matthes has been appointed assistant manager of sales for the large motor and generator divisions.

C. S. Johnson Co., Champaign, Ill., announces the appointment of E. M. Wakeman & Associates, Lakeland, Fla., to handle the company's entire line of cement handling and concrete batching equipment in northern Florida and southern Georgia.

Allegheny Ludlum Steel Corp., Pittsburgh, Penn., has announced the appointment of E. H. Forsstrom as director of training. He was formerly assistant manager of the Watervliet, N. Y., plant. W. J. Baldwin, chief metallurgist at the plant, has been appointed to succeed Mr. Forsstrom as assistant plant manager.

Lippmann Engineering Works, Milwaukee, Wis., recently held its third annual sales and service school at the plant in Milwaukee, Wis. Distributors from all over the country and various parts of the world were in attendance.

Alloy Rods Co., York, Penn., announces the appointment of Frank L. Blodgett as sales manager of the hard surfacing division, with headquarters at York, Penn.

The Ironton Fire Brick Co. Ironton, Ohio, announces that C. E. Bales, formerly vice-president, has been elected president of the company, and that Robbins & Bohr, Chattanooga, Tenn., has been appointed representative for Tennessee.

Hardinge Co., Inc., York, Penn., has signed a contract with Ellicott Machine Corp., Baltimore, Md., giving the Hardinge organization exclusive manufacturing and sales rights for the Kuntz continuous feed automatic type lime kiln and the Kuntz lime hydrator. The contract also makes Hardinge Co. exclusive suppliers of repair parts for the Clyde and Schultness hydrators, as well as the Sobek kiln.

Timken Roller Bearing Co., Canton, Ohio, announces that J. R. Comber, former manager of the sales order division, has been named to head the Canton office of the automotive division. He will also handle special sales administration assignments. E. H. Hughes, systems department manager, has been named to succeed Mr. Comber as manager of the sales order division. Associated with him are T. J. Wayne, manager automotive orders; H. P. Dickerhoff, manager industrial orders; and J. L. Brown, manager bearing order control.

Hewitt-Robins, Inc., New York, N. Y., announces that Thomas Robins, Jr., president of the company, has been elected board member designate of the National Industrial Conference Board, Inc., to represent the Rubber Manufacturers' Association for a term of one year.

Chain Belt Co., Milwaukee, Wis., announces the appointment of Marshall E. Cusic as a district sales engineer with headquarters at the Pittsburgh, Penn., district office.

B. F. Goodrich Co., Akron, Ohio, has appointed H. L. Dixon, formerly production superintendent of the industrial products division, as manager of belting and matting. Associated with him are David G. Hunt, production manager; Harold Walsh, staff manager; Herbert L. Fink, technical manager; and Louis Ream, process engineer. Carl Barnes, Joseph Foley and Robert Hamlin continue as general foremen of the departments they su-

FAST ACTION . . .



with this EAGLE LOADER

One man operated — 3 to 5 yards per minute —

Job to job at truck speed.

Send for details — Catalog No. RP-66.



JAW CRUSHERS • IMPACT BREAKERS
PULVERIZERS • CONVEYORS • LOADERS

EAGLE

CRUSHER CO., Inc. GALION OHIO U-S-A

Move more yardage
Easily
at lower cost

with a
**SAUERMAN
POWER SCRAPER**

Picture shows a 4 cu. yd. Sauerman Power Scraper of the rapid-shifting type at the new plant of Albuquerque Grovel Products Co. With this latest type of Sauerman machine, the operator has automatic control of shifting the tail block. Sitting at the scraper hoist at the head end of the installation, he can shift the bucket quickly to any spot in the deposit. The cable radius of this particular installation is 500 ft. and the handling capacity is 250 cu. yd. an hour. About one-half million yards is within immediate reach of the scraper. Later, the mast will be moved and the pit extended another 500 ft.

• When the job calls for digging, hauling and dumping loose materials at long range — it pays to install a Sauerman Power Scraper. Thousands of users testify that this is a sure way to cut costs — increase yardage.

A Sauerman Power Scraper digs in any kind of ground — dry, wet or mucky — delivers large loads rapidly anywhere within its cable radius and dumps cleanly.

One quickly trained man handles the entire operation. First cost is low, so is the maintenance expense.

**Rope Haulage
Equipment
Specialists
Since 1909**

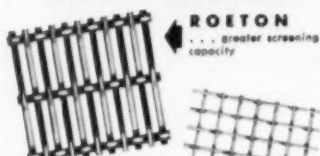
Write for new 24-page Catalog 19-A

SAUERMAN BROS., Inc.

530 S. Clinton Street

Chicago 7, Illinois

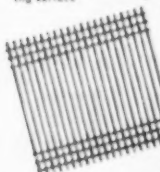
For maximum saving... THE RIGHT CONSTRUCTION IN THE RIGHT METAL



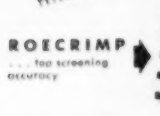
ROETLON
... greater screening capacity



ROEFLAT
... maximum wear ing surface



ROESLOT
... almost screening capacity



ROECRIMP
... top screening accuracy

• ALL FOUR of the above Roebbling screen constructions can be supplied in Roebbling Stainless, Abraso, Roetemp, Monel or other metals. Thus you can combine the most efficient construction for your operations with the metal that will give longest life to your screens. And what's more, both Roeslot and Roetlon can be had in RoeFlat construction which has 75% more metal wearing surface—extreme wear resistance—longer life. For smaller sizes in square mesh, RoeCrimp meets exacting requirements for openings from $\frac{1}{8}$ " to $\frac{1}{16}$ ". Send coupon for full information.

FOR WOVEN WIRE SCREENS...

Today it's Roebbling!

WOVEN WIRE FABRICS DIVISION

JOHN A. ROEBBLING & SONS COMPANY
ROEBBLING, NEW JERSEY

Woven Wire Fabrics Division
John A. Roebbling & Sons Co., Roebbling, N. J.
Gentlemen: Send me full information about
Roebbling Woven Wire Screens for maximum
service and economy.

Name.....Title.....
Company.....
Address.....
City.....State.....

A CENTURY OF CONFIDENCE

Financial

SANTA CRUZ PORTLAND CEMENT CO., San Francisco, Calif., income account for the years ended December 31 is as follows:

	1949	1948
Net sales	\$3,819,997	\$3,295,741
Cost of sales	2,084,753	1,803,784
Gross profit	1,734,244	1,491,957
Vessel oper. prof.	16,359	43,209
Total revenue	1,750,604	1,448,748
Selling, etc., exp.	319,863	297,412
Deprec. & deplet.	247,734	247,444
Operating profit	1,183,106	903,925
Other income	86,267	90,935
Total income	1,269,373	994,827
Income charges		28,844
Federal income tax	482,000	359,053
Net income	787,373	606,930
Earn. surplus, 1-1	4,935,426	4,568,652
Dividends	500,000	250,000
Stk. disc. wr. off.	3,424,700	
Line dep. apprec.	10,655	12,828
Earn. surplus, 12-31	1,811,754	4,935,426
Earn. per share	\$7.87	\$6.07
No. of shares	100,000	100,000

Note: Above figures do not include operations of Santa Cruz Line Co., a wholly-owned subsidiary.

ALPHA PORTLAND CEMENT CO., Easton, Penn., income account for the years ended December 31 is as follows:

	1949	1948
Net sales	\$20,727,848	\$19,275,836
Oper. expenses	12,027,020	11,767,650
Maint. & repairs	2,694,861	2,378,934
Deprec. & deplet.	671,861	632,672
Operating profit	5,334,997	4,476,560
Other income, net	8,828	2,344
Total income	5,343,825	4,478,904
Federal income tax	2,090,000	1,730,000
Net income	3,253,825	2,748,904
Surplus, Jan. 1	4,840,975	3,275,470
Com. dividends	1,708,642	1,178,712
Surplus, Dec. 31	6,385,258	3,849,974

WEST BEND CONCRETE PRODUCTS CO., West Bend, Wis., increased its stock from 500 shares at \$100 each to 1000 shares at \$100 each.

NATIONAL GYPSUM CO., Buffalo, N. Y., consolidates sales and earnings to December 31 is as follows:

	1949	1948
Sales	\$59,439,883	\$68,125,235
Net income	5,836,707	7,997,976
Earnings common share	\$2.57	\$3.60
No. of common shares	2,112,336	2,112,336

After income taxes.

President Melvin H. Baker in the annual report to stockholders said, "Most of our plants are carrying a fair backlog of unshipped business, and sales for the first two months of this year were substantially ahead of

last year. Perhaps the most satisfying achievement of the year was the fact that the organization demonstrated its ability to operate successfully the expanded business in a competitive market. It was the first year in which all National's expanded production facilities were in operation."

PERMANENTE CEMENT CO., Oakland, Calif., recommended that a 100 per cent stock dividend be paid, increasing the outstanding shares from 700,000 to 1,400,000. Authorization of this plan at the March meeting and consent of the California corporation commissioner resulted in an April 29 quarterly payment of 30 cents a share on the increased amount of stock instead of 60 cents.

OREGON PORTLAND CEMENT CO., Portland, Ore., income account for the years ended December 31 is the following:

	1949	1948
Gross profit	\$1,084,267	\$ 907,224
Deprec. & deplet.	115,701	108,639
Operating profit	968,566	798,584
Income taxes	394,712	319,585
Net profit	573,854	479,000
Earn. pref. share	\$42.58	\$34.94
Earn., common share	7.90	5.74
No. of pref. shares	15,476	13,711
No. of common shares	72,320	71,515

GIANT PORTLAND CEMENT CO., Philadelphia, Penn., reports the following consolidated income account for the years ended December 31:

	1949	1948
Net Sales	\$4,451,265	\$3,185,406
Cost of sales	3,131,603	2,004,151
Selling, etc., exp.	407,229	305,260
Operating profit	912,433	855,995
Profit, assets sold	517	1,148
Other income	8,944	36,390
Total income	921,894	893,533
Interest	19,214	20,563
Other deductions	922	167,317
Income taxes	393,750	359,750
Net income	508,508	445,903
Earn. surp., 1-1	361,093	215,360
Dividends	129,021	84,810
Debit		*215,360
Earn. surplus, 12-31	741,081	361,093
Earn., common share	\$0.59	\$0.55
No. of common shares	853,490	848,145

*After depreciation and depletion: 1949, \$132,913; 1948, \$69,117.

*Experimental and preliminary manufacturing expenses of Harleysville, S. C., plant.

*Redemption of outstanding dividend arrears certificates, less \$16,370 charged to capital surplus.

The report to stockholders said the company's new quarry has definitely proved its worth in better quality raw material and that the amount of lime-

MANGANESE STEEL CASTINGS

for
PULVERIZERS
CRUSHERS
ROLLS
SCREENS



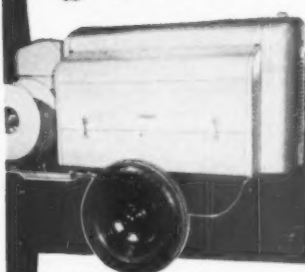
for
SHOVELS
DREDGES
CRANES
CONVEYORS

The Frog, Switch & Mfg. Co.

Established 1881

CARLISLE, PA.

Bring Compressor Costs Down!



Use the Economical SMITH 105-P Compressor

The new Smith 105-P will handle the majority of your compressor jobs, for less. Powered with Chrysler's newest and largest Industrial engine—Ind. 15, six cylinders, 4" bore, 5" stroke, 377 cu. in., 3" crankshaft, 7 main bearings, sodium cooled valves and Stellite valve seats for extra heavy duty and long life. Compressor valves are stainless steel disc type with Manganese Bronze seats. Delivers 105 cubic feet per minute. Equipped with improved type pilot valve and simplified control for efficient, long life with minimum attention.

Write for literature and prices.

Also write for information on
The New SMITH
MODEL 70-P COMPRESSOR

SMITH Air Compressors

Gordon Smith & Co. Bowling Green, Ky.

485 COLLEGE STREET

stone purchased by the company dropped from 15 percent in 1948 to 6.9 percent in 1949.

MISSOURI PORTLAND CEMENT CO., St. Louis, Mo., reports for the twelve months ended December 31:

	1949	1948
Share earn.	\$4.85	\$3.98
Net sales	9,309,098	8,318,177
Net income	1,429,286	1,168,477

INDIANA LIMESTONE CO., INC., Bedford, Ind., consolidated income account for the years ended November 30 is as follows:

	1949	1948
Net sales	\$6,238,440	\$4,181,648
Cost of sales	4,460,926	3,111,544
Selling, etc., exp.	507,557	409,775
Operating profit	1,269,957	660,330
Other income	101,698	71,633
Total income	1,421,655	731,963
Bond interest	83,463	91,916
Other interest	1,521	7,391
Bad debt wr-off		217,944
(Other deductions)	370,791	156,674
Fed. income tax	382,000	95,000
Pr. vt. inc. tax	47,500	
Net profit	654,239	163,038
Prev. earn. surp.	161,676	41,362
Earn. surp., 11-30	785,916	161,676
Times int. earn.	12.94	3.40
Earn., com. share	\$4.81	\$1.26
No. of com. shares	129,790	129,790

(Before income taxes.)
(Includes loss on discontinued products: 1949, \$297,416; 1948, \$16,438.)

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., reports for the years ended December 31 are as follows:

	1949	1948
*Net com. share	\$0.45	\$0.71
Sales	18,373,216	12,807,525
Net profit	397,780	662,920

*In 1949 on 76,974 common shares after \$63,323 preferred dividends; in 1948 on 736,978 common shares after \$64,853 preferred dividends.

CANADA CEMENT CO., LTD., Montreal, Can., reports the following for the fiscal year ended November 30:

	1949	1948
Operating profit	\$12,568,635	\$10,394,762
Deprec. & deplet.	3,770,948	3,294,184
Directs. fees, etc.	158,922	149,781
Balance	8,638,765	6,950,797
Earn. from invest.	39,791	27,384
Total income	8,678,556	6,978,180
Bond interest	43,443	58,318
Misc. interest		4,800
Pension fund	200,000	125,000
Cap. assets loss	49,914	362,896
Income taxes	3,565,000	2,700,000
Net income	4,820,196	3,727,566
Pr. div. maint. fd.	812,000	400,000
Balance	4,008,196	3,327,566
Prev. earn. surp.	6,530,415	4,508,497
Preference divs.	1,305,648	1,305,648
Earn. surp., 11-30	9,232,963	6,539,415
Times int. earn.	19.02	102.67
Earn. pref. share	\$4.80	\$5.71
Earn. com. share	5.86	4.04
No. of com. shares	1,004,345	1,004,345
	600,000	600,000

(Before income taxes.)

LONGHORN PORTLAND CEMENT CO., San Antonio, Tex., income account for the years ended December 31 is as follows:

	1949	1948
Net income	\$1,159,957	\$1,256,721
Earn. surplus, 1-1	1,106,545	847,944
Common dividends	908,326	908,326
Earn. surplus, 12-31	1,267,982	1,106,340
Earn., common share	\$2.92	\$5.93
No. of common shares	434,160	249,590

(After Federal income taxes.)

LEON SAND AND GRAVEL CO., San Antonio, Texas, has received authorization from the Secretary of State in Austin to increase its capital stock to \$100,000.

do 4 days' work in 3

with JAEGER pressure



125 ft. of 100 lb. air
—Runs 2 heavy breakers
or a heavy duty rock
drill at full pressure.

15% to 20% more air @ 100 lbs.
does 30% to 40% more work

It is important to you that, at full pressure, air tools hit enough harder and faster to do 30% to 40% more work than they do at the 70 lbs. pressure maintained by undersized compressors.

Jaeger "new standard" ratings (the first increase in the industry since 1932) give you the air you must have to run today's tools at proper pressure and efficiency—75 ft. of 100 lb. air instead of 60—125 ft. instead of 105—185 ft. instead of 160—250 ft. instead of 210—365 ft. instead of 315—600 ft. instead of 500. If this cost-saving interests you, send for Jaeger Catalog JC-8.

600 ft. of 100 lb. air — Runs 2 big
wagon drills at full pressure, drilling
30% to 40% more footage than you
can get with any 500 ft. compressor.



See your Jaeger distributor or write

THE JAEGER MACHINE CO.

Columbus 16, Ohio Cable: BIGANLITE

PUMPS • MIXERS • HOISTS • TOWERS
TRUCK MIXERS • PAVING MACHINERY



For Efficient Gravel Production—H&B Pumps

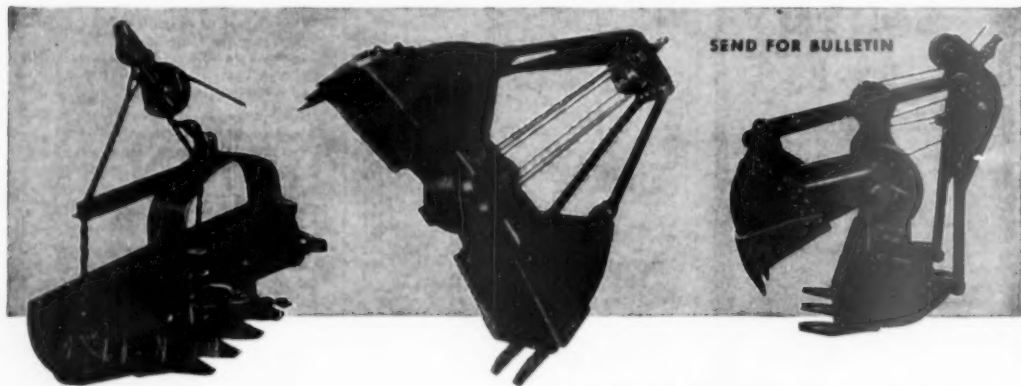


The Walt Keeler Co., of Wichita, Kansas, two views of whose plant are shown above, are as particular about the efficiency of their equipment as they are about the appearance of their plant. And, as may be inferred from the pictures, that's being very particular. It's not surprising, therefore, to find an 8" Hetherington & Berner Dreadnaught Pump in their pump house.

The Walt Keeler Co. is typical of the many important gravel producers in all parts of the country who have found H & B pumps dependable and efficient. H & B Standard and Dreadnaught type pumps are available in sizes to meet the requirements of any type of dredging job and head conditions.

Write for Bulletin DP-147.

HETHERINGTON & BERNER INC. • 717 KENTUCKY AVE., INDIANAPOLIS 7, INDIANA



SEND FOR BULLETIN

For Longer Life!
WELLMAN
Williams Type **BUCKETS**

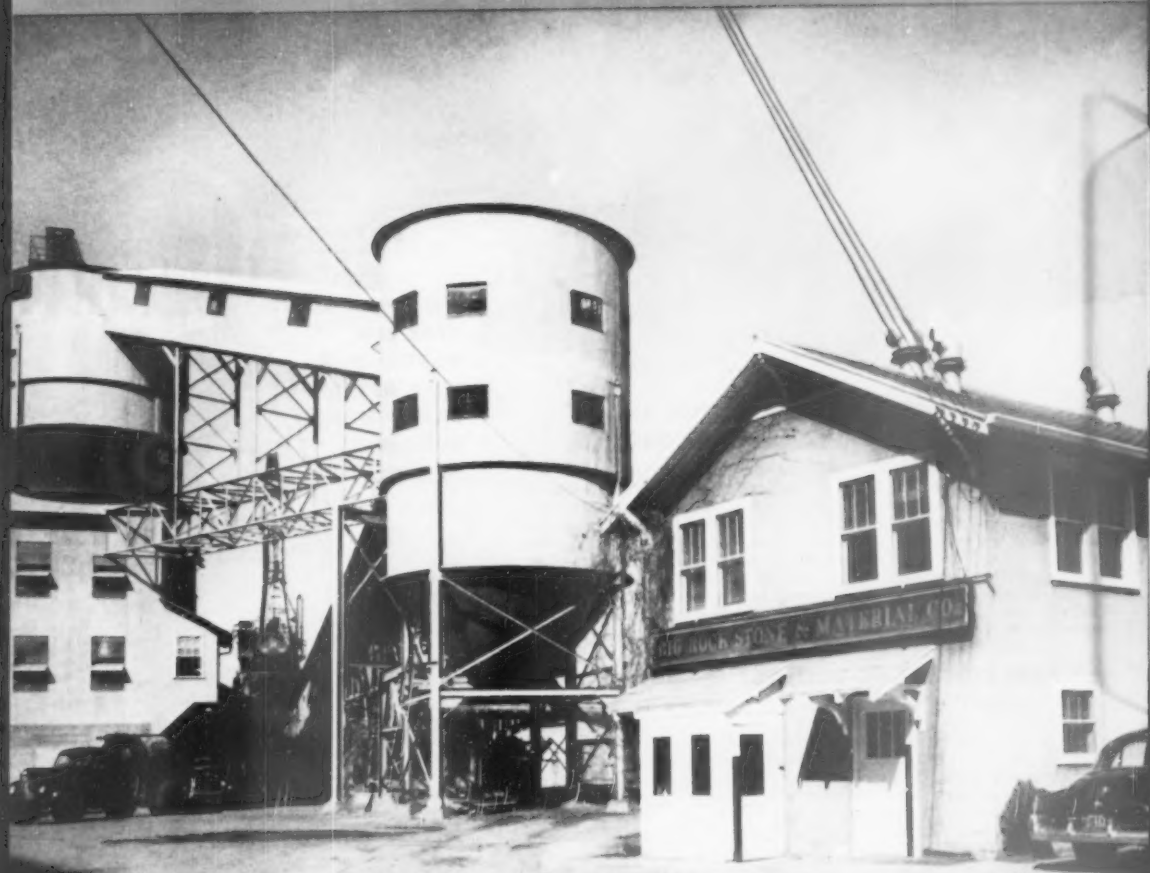
● Count on longer life and more efficient service ... due to Wellman original **welded rolled steel construction**. You get the maximum digging power, and exceptional strength—without excessive weight! Specify Wellman, and you'll specify the best bucket for your purpose.

THE WELLMAN ENGINEERING COMPANY
 7025 CENTRAL AVENUE CLEVELAND 4, OHIO

CONCRETE PRODUCTS

A SECTION OF ROCK PRODUCTS

CONCRETE UNITS · READY-MIXED CONCRETE



Ready-mixed concrete plant of Big Rock Stone & Material Co., Little Rock, Ark.

BLAW-KNOX *Hi-Boy* TRUKMIXER SEAL

GUARANTEED*
for one year!



SEAL BETWEEN MIXING DRUM AND REVOLVING HOPPER IS NEVER BROKEN

HERE is how it works. The dual-purpose hopper is rotated by the movement of the mixing drum and held in charging or discharging position by the automatic latch. The drum and hopper are jig assembled during fabrication and will always remain in true concentric alignment since the hopper is entirely supported on the end of the mixing drum. There's no possibility of misalignment or any eccentric grinding action which might destroy the seal. Result—a trouble-free rear end—Mixers are not laid up for frequent repairs with resultant loss of yardage and disruption of deliveries. A worn seal on the Blaw-Knox Hi-Boy can be replaced in 30 to 40 minutes!

FREE DISCHARGE WITHOUT SEGREGATION

THE speed of concrete discharging is controlled by the rotation of the mixing drum—a handful at a time or the entire load *without segregation*. There's no slow, laborious discharge gate mechanism for the driver to operate. Change from charging to discharging by the flick of a latch. There is no gate to restrict discharge and strain the larger particles out of the mix which makes the first part of the batch predominantly fine and the last part coarse. With the Blaw-Knox Revolving Hopper you never discharge segregated concrete but always thoroughly mixed, uniform batches.

The rear end hopper, long proved an essential part of high discharge mixers, gives you these additional advantages over a top charging opening: faster charging—initial mix while charging—instantaneous shrinkage of batch—and greater capacity.

Ask your nearest Blaw-Knox distributor to show you a Hi-Boy in operation or write today for details on the Complete Blaw-Knox Ready Mix Package.

GUARANTEE

"Blaw-Knox guarantees the rubber seal between the revolving hopper and drum of the Hi-Boy Trukmixer for one year, providing it is greased daily. That's the guarantee that means an end to tailgate troubles and seal maintenance headaches."

**BLAW
KNOX**

**THE ONLY
REAR END
HOPPER SEAL
THAT OPERATES
SAFELY WHILE
SUBMERGED
IN CONCRETE**



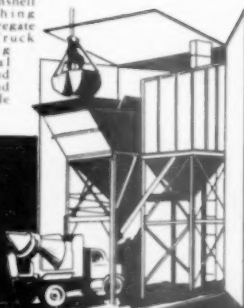
The Blaw-Knox Complete Ready-Mix Package includes—a complete line of Clamshell Buckets, Batching Plants for Aggregate and Cement, Truck Mixer Loading Plants, Central Mixing Plants and Truck Mixers and Agitators in a wide range of sizes.

BLAW-KNOX

BLAW-KNOX DIVISION of Blaw-Knox Company

Farmers Bank Bldg., Pittsburgh 22, Pa.

Birmingham • Chicago • New York • Philadelphia • Washington



**A COMPLETE
READY-MIX
OUTFIT
IN ONE
PACKAGE
from
BLAW-KNOX**
Material Handling
and Storage,
Batching
Truck Mixers

INDUSTRY NEWS

Accelerating Hardening of Concrete Before Prestressing

ABSTRACTED BY F. O. ANDEREGG

When made from high early cement it is possible, by heating to 160 deg. F. for 6 hr., to harden concrete or mortar sufficiently to grip stretched wires and thus permit the application of the prestress to a given member. M. K. Ros of Zurich has developed a beam and floor system made of prestressed clay tile. The most convenient method of applying the heat is electrically, since its locus of application can be controlled readily. The work was described in *Schweizer Archiv*, vol. 15, No. 2, p. 48 (1949).

Company Merger

COLUMBUS BUILDERS SUPPLY, INC., and WILLIAM MILLER CO., both of Columbus, Ohio, have merged into a new concern known as Columbus Ready-Mix Corp. Officers of the new corporation, capitalized at \$50,000, are William Miller, president, William F. Kern, Jr., vice-president and general manager, Robert G. Kern, secretary and Roy C. Kirsch, treasurer. The officers also comprise the board of directors. The new corporation will operate a fleet of 12 trucks. Facilities for a third plant are available.

Reinforced Concrete River Weights

USE OF REINFORCED CONCRETE river weights to hold pipe lines under water was demonstrated on a large scale recently at the Tennessee River crossing of the Texas Gas Transmission Corp., Owensboro, Ky. The project involved anchoring two 22-in. gas lines at a point where the river is 1300 ft. wide. To accomplish this, contractors and engineers used 200 rounded river weights supplied by Universal Concrete Pipe Co., Columbus, Ohio. The

concrete river weights are made by pouring concrete over reinforcing steel in special forms and vibrating the concrete after pouring to assure uniform strength and density. The weights are made in halves and bolted securely over the pipe. A reinforcing bar loops through a recess in the center of each weight for easy handling by crane.

The Tennessee weights were shipped to the project on flat cars, with the two halves bolted together. At the project workmen welded the pipe into a continuous line, cleaned, primed, painted and wrapped it. The weights were clamped on 6½ ft. centers along the portion to be submerged. The crossing was started by lifting the continuous pipe onto dollies running along a narrow-gauge track. Barges in the river and winches and tractors on the bank floated the line at a depth of three to five feet to the opposite shore. The entire line was then lowered into a trench on the river bottom.

Reinforced concrete river weights are said to offer several advantages on projects of the Tennessee River type. Because of their great weight, much lighter gas or other pipe can be used; maintenance cost is lowered due to the extra protection against swift currents; rounded construction of weights allows the line to roll or twist as it is snaked into the water.

Sampling and Testing of Concrete

NATIONAL READY MIXED CONCRETE ASSOCIATION'S publication, "Recommended Practices for Sampling and Testing Ready Mixed Concrete," supplies have been exhausted and because of continuing demands the booklet has been reprinted with certain modifications to bring references and test methods up to date. The association is prepared to supply member companies and others with the booklet in quantity at a cost to the association of about 15 cents per copy. It also may be arranged to imprint on the cover an inscript such as "Distributed by 'X' Co."

Expands Block Plant

VIRGINIA CEMENT BLOCK CO., Virginia, Minn., according to owners T. M. Seppi and I. E. Seppi, has expanded business to the point where a new bulk cement plant will be necessary to take care of anticipated area building needs in 1950. The proposed plant will make the manufacturing of concrete and cinder block nearly automatic. A new crushing and screening plant for cinders has been provided to better the quality of cinders for block manufacture.

SOMERS-BARR CO., Urbana, Ill., has announced plans to set up a central-mixed concrete plant incorporating modern equipment for proportioning and handling of aggregates and cement. The company has purchased the new equipment from the C. S. Johnson Co. of Champaign, Ill. The plant will include a 100 cu. yd. all-welded aggregate bin for handling four types of aggregates, and a central cement tank of 155 bbl. capacity and special unloading and storage units. The complete unit will supplant Somers-Barr's present equipment.

LAKE SHORE CEMENT PRODUCTS CO., Michigan City, Ind., began construction on a new 5,000-sq. ft. storage warehouse. The 50- x 100-ft. warehouse will have concrete flooring and footings, concrete block walls and a truss roof.

CEN-TEX CONCRETE PIPE CO., Austin, Texas, was incorporated recently with capital stock of \$50,000. The firm was organized by H. H. Dickehut, manager for 20 years of the Austin Concrete Works. Mr. Dickehut is president and general manager of Cen-Tex Co. Fred Swanson is vice-president and Amanda Williamson is secretary-treasurer. The firm now is negotiating for a site and expects to set up its plant and begin turning out concrete pipe in the near future.

CONCRETE PIPE AND PRODUCTS CO., and Superior Building Units, Inc., both of Richmond, Va., have consolidated operations. The Superior plant now will be known as Concrete Pipe and Products' Northside Plant No. 2. The company will continue to produce the same products.

ADAMS CONCRETE SERVICE, Azusa, Calif., has opened a portable ready-mixed concrete plant at the Elledge Pipe Yard between Indio and Coachella, Calif. The plant, owned and operated by Frank Adams, uses 3-cu. yd. truck mixers.

SOUTH SIDE CONCRETE, INC., St. Louis, Mo., is erecting a new \$50,000 ready-mixed concrete plant. The firm is headed by John M. Mohan, vice-president of Majestic Building Materials Corp., St. Louis.

A READY-MIXED concrete and block plant will be opened in Manchester, Iowa, by Thomas A. Henderson, who operates a similar plant in Monticello, Iowa.

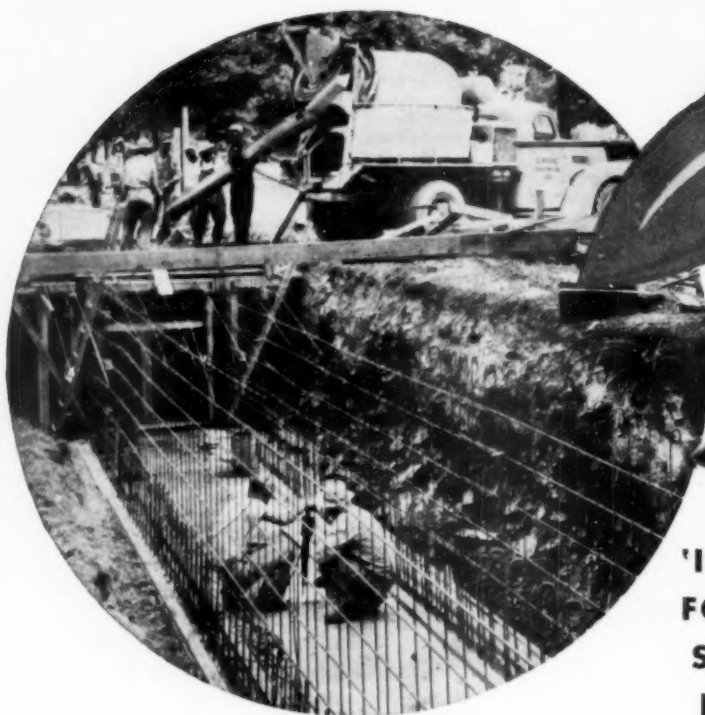
COOLIDGE SAND & ROCK CO. has established a \$35,000 ready-mixed concrete operation at Coolidge, Ariz. According to Warren Eyer, manager, four 5-cu. yd. ready-mixed concrete trucks have been purchased.

GIFFORD-HILL PIPE CO., Fort Worth, Texas, has added a Martin Model 24 pipe machine as a part of its expansion program.

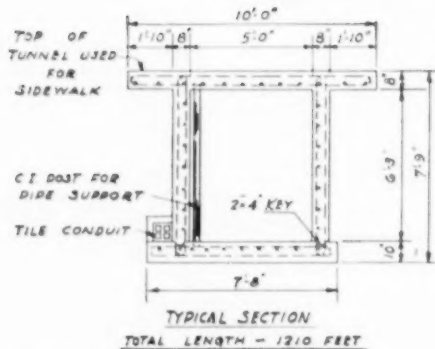


Weights bolted on gas pipe at Tennessee project

Here's Why They Ask for 'Incor'



'INCOR' HALVES FORM COSTS OF SIDEWALK-TOP HEAT TUNNEL



● Meet the Jayhawk, fabulous bird-mascot of fast-growing University of Kansas. Running heat piping from central plant to new buildings meant disfiguring the beautiful campus. Ingenious solution was a heating tunnel under the sidewalk.

'Incor' 24-Hour Cement was used to speed completion, reduce form costs. Concrete placed one day...forms stripped and re-used the next...saving one and possibly two form sets. On-time completion at less cost, bone-dry tunnel, a good-looking job—everybody pleased.

Another example of why the nation's leading Ready-Mix Operators make 'Incor'* concrete available at all times—for customers' time-and-money-saving convenience. *Reg. U. S. Pat. Off.

HEATING TUNNEL, UNIVERSITY OF KANSAS, Lawrence
Architect: **CHARLES L. MARSHALL**, State Architect, Topeka
Contractor: **CONSTANT CONSTRUCTION CO.**, Lawrence
Ready-Mix 'Incor' Concrete: **THE READY-MIX CO.**, Lawrence



LONE STAR CEMENT CORPORATION

Offices: ALBANY • BETHLEHEM, PA. • BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS • JACKSON, MISS.
KANSAS CITY, MO. • NEW ORLEANS • NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D. C.
LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS—25 MODERN MILLS, 27,500,000 BARRELS ANNUAL CAPACITY

Twin City Concrete Products Co., Minneapolis, Minn., undertook a lively campaign to sell output of new Sakrete plant



General plant view showing Sakrete mixing hopper, extreme left, and main sand hopper to its right which supplies sand and gravel to both the Sakrete and concrete pipe plants

Effective Merchandising of Dry Packaged Concrete

WHEN J. M. LAMBERT, president of Twin City Concrete Products Co., Minneapolis, Minn., took on the Sakrete franchise in March, 1949, for a new sales territory, he launched an introductory campaign that for speed and effectiveness should impress the most seasoned sales manager.

Sakrete is a dry-mixed, packaged concrete of accurately proportioned sand, gravel, and portland cement, developed by Arthur C. Avril of Sakrete, Inc., Cincinnati, Ohio (Rock Products, November, 1946, and November, 1948). It needs only the addition of water, produces a concrete with a strength of 4000 p.s.i., and is guaranteed not to harden in the bag for a year. It was designed primarily for the occasional user and for small jobs,

but its convenience and dependability are enlarging this field rapidly.

Twin City Concrete Products Co. is Sakrete's newest licensee, operating in a 300-mile radius of the Twin Cities in western Wisconsin, southern Minnesota, and the state of Iowa. The firm manufactures sand mix, packaged in 45- and 80-lb. bags; gravel mix, in 45- and 90-lb. bags, and mortar mix, in 45- and 80-lb. bags.

Promotion of Product

Mr. Lambert's promotional program got under way immediately with a display of Sakrete products at the Minneapolis Builders' show in March, 1949. Over 100,000 persons saw the show, and inquiries and orders from

dealers and consumers started coming in immediately. Some customers who had attended came in person to the Twin City office to pick up a few bags of Sakrete for personal use.

Production had not yet started at that time. In fact, it was not until September of last year that the new plant was completed, so for six months orders were filled through carloads of Sakrete shipped in from Cincinnati.

An advertising program was started in Twin City newspapers which have a combined circulation of over 700,000, a good percentage of it in surrounding towns and rural areas. Sakrete ads appeared on the builder's page every Sunday, and are said to have brought a noticeable increase in inquiries and orders. These were fol-



J. M. Lambert, president



Walter Dohi, sales manager



H. Johnson, plant superintendent



Closeup view of interior, showing bagging operation

lowed up with individually-typed letters and sales literature.

Three salesmen were hired to sell Sakrete exclusively. They call on lumber and building material dealers and on hardware stores in the Twin Cities area. Later, a Sakrete sales manager, Walter Dahl, was appointed.

Newspaper mats for dealer use were made up and offered with the inducement of a week's advertising paid by Twin City Concrete, to introduce Sakrete products in the dealer's community. This proved very attractive, and many dealers have continued to advertise Sakrete regularly.

Sakrete pamphlets were distributed by the thousands, as well as king-size book matches in convenient plastic racks, bearing the legend "You're welcome." These, Mr. Lambert believes, have made many "impulse" sales where the customer has come to the lumber yard for something else, has seen the matches on the counter, and has bought a couple of bags of Sakrete as a result.

Sakrete signs were put up in dealers' offices and yards. These, both Mr. Lambert and Mr. Dahl believe, are one of the product's best selling tools. Cartoons show the advantages of Sakrete products by comparing a bewildered householder grappling with the mixing of sand and cement, with an unruffled user of pre-mixed Sakrete.

A 12-ton capacity enclosed trailer was purchased to speed up deliveries and serve as an advertising medium at the same time. The firm now has four such trailers, and plans to add another four shortly. Television was used in the Twin City area with a film showing how to use Sakrete for sidewalks and "round-the-house" repairs.

"Our job is to get the public to go to the dealer and ask for Sakrete," Lambert commented. "That's why we have devoted so much of our advertising to the consumer. If we have enough people asking for Sakrete at the lumber yard, the dealer has to

stock it so that he can serve his customers."

Dealer advertising was tied in with consumer advertising by running Sakrete ads in trade magazines serving the construction field. This year, Twin City Concrete has exhibited its product at lumber dealer conventions.

Plant Operation

On September 1, the firm's new \$80,000 Sakrete plant began operation. The plant adjoins the pipe plant operated by Twin City Concrete, where 100 tons of reinforced concrete pipe for storm sewers are turned out every day. The combined plants occupy 8 acres in an industrial area on the southeast side of the Mississippi river.

From the beginning, the Sakrete plant has operated at capacity, due to the success of the introductory campaign. Until the men became acquainted with the equipment and developed an efficient routine, capacity was 400 bags per day. This now has been stepped up to 1000 bags per day for two men working an 8-hr. shift, and will be increased to 2000 bags per day shortly by putting on a night shift.

The new plant represents the last word in efficient, labor-saving layout. Trucks haul sand and gravel in from a local pit, and dump it into an au-

tomatic conveyor which takes it to the main sand hopper that serves both plants. Sand for Sakrete is diverted into a 40-ft. rotary dryer, where it is dried at a temperature of 400 deg. F. From the dryer, it is conveyed to the processing tower, where weighing and mixing of the ingredients are accomplished automatically. The mixed product then drops down into a hopper and is ready for bagging. Precision, push-button control is a feature of the bagging operation. Four-wall, waterproof Bemis paper bags are used which, when filled, go to a Union sewing machine, three feet to the left of the bagger, and are sewn shut. The operator can sew 3 bags a minute.

The filled bags are placed and stored on pallets. These are tapered at the bottom, so that they can be easily tipped onto two-wheel Twin-Tilt trucks. Each pallet holds 10 bags. The pallets also are used for loading and unloading the trailers. Mr. Lambert estimates he saves 15 percent in labor by eliminating individual handling of bags, another reason for enlarging the trailer fleet. Trailers are loaded at night, so that they are all ready to go in the morning.

The manufacture of Sakrete and concrete pipe makes an excellent combination for it enables Twin City Concrete to buy sand and cement in large quantities, and use the same type of equipment for handling both products. Two carloads of cement per week are needed by the two plants.

Sakrete sales have more than doubled in the last few months. Due to the energetic advertising and field coverage, Mr. Lambert estimates that only one or two percent of dealers in his area have not yet heard of Sakrete. One of the surprising developments, so far as retail consumers are concerned, is the interest which women have shown in Sakrete products. They not only buy and use it themselves, but interest their men-folk in its possibilities.

Other outlets are being promoted rapidly. Ready-mixed concrete plants and concrete block contractors are becoming large users of the material. City park boards have been interested in keeping Sakrete on hand for work around park and playground buildings. Oil companies are finding it handy for filling station maintenance. One Minneapolis public utility has equipped each of its service trucks with several bags of Sakrete, so that when it is necessary to tear up a sidewalk or street, it can be repaired immediately. This saves sending out another crew to mix cement and sand. Concrete grain elevators use it for filling in cracks as they develop. Sakrete also may have a future as protection for steel bridges, by being sprayed on in place of paint.

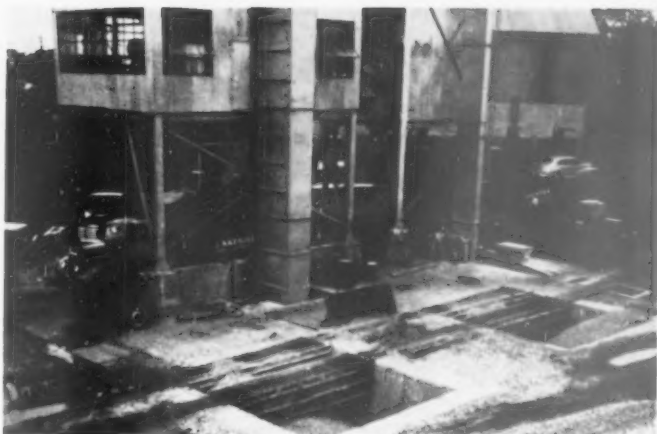
In addition to Twin City Concrete Products Co., Mr. Lambert owns Truck Crane Service, which rents cranes to contractors. This firm has a fleet of 15 mobile and crawler-type cranes, each with 90-ft. booms.



Company trailer promotes product

Supply Company Adds Ready-Mix Facilities

Transit-mixed concrete new product of Lakeside Fuel and Supply Co., Mt. Clemens, Mich.



Receiving pits are arranged so that sand and aggregate can be delivered to plant by truck or rail. Cement is delivered to screw conveyor, right, for transfer to storage.

THE LAKESIDE FUEL AND SUPPLY CO., Mt. Clemens, Mich., was established in 1897 to supply coal and building materials to the Mt. Clemens territory which is about 16 miles from Detroit. Since that time the company has grown until today the buildings and yard cover about seven acres of ground. The business is owned and operated as a partnership by Harry Levine and sons, Abe, Meyer and Gene, who are all actively engaged in the business.

The most recent Lakeside develop-

ment is a new transit-mixed concrete plant which began operations April 5, 1949. In addition to supplying concrete for local city needs, it supplies materials and transit-mixed concrete to surrounding heavily populated areas. The large, permanent U. S. Air Forces installation, Selfridge Field, is located only a few miles from Mt. Clemens.

The Levines started business in April with three 4½-cu. yd. Jaeger mixers mounted on White trucks. Since that time, the firm has under-

taken state highway department work and has added a fourth truck of the same size.

Receiving Pits

Receiving pits are arranged so that sand and aggregate can be delivered to the plant by truck or rail hopper car. From the combined truck and rail hoppers, the materials are transferred by belt conveyor to a bucket elevator of special design, and having a rated capacity of 200 t.p.h., for storage in a Blaw-Knox 4-compartment, 300-ton rectangular overhead bin. The bucket elevator discharges into a turn-head which rotates to stationary chutes properly placed for charging each compartment separately.

Bulk cement, also delivered by truck or covered hopper cars, is conveyed to a Blaw-Knox 1200-bbl., 2-compartment overhead circular tank for storage by a Blaw-Knox bucket elevator having a rated capacity of 250 bbl. per hr. Cement is conveyed to the elevator by a 9-in. screw conveyor.

The main hopper is flanked on each side by 150-ton underground storage bins from which sand or aggregate can be delivered into the hopper or to stockpiles by clamshell as needed.

Batching

Aggregates and cement are weighed separately, and discharged simultaneously to the mixer trucks. The aggregates are weighed on a 20,000-lb. Dial scale, and cement is measured automatically by means of a 12-in. dia. screw conveyor leading from the bottom of the cement storage bin to the weigh batcher which is centrally located with the aggregate batcher and water proportioner. The cement batcher is equipped with a Toledo dial scale with automatic recorders. The ticket number, date and weight of the batch of cement is recorded on a tape and is kept as a permanent record of the load.



Batching and premixing plant of The Lakeside Fuel and Supply Co. with cement storage tank, right. Clamshell is used to deliver aggregates to hopper or stockpiles.

Major Installation of Culvert Pipe

New Mexico contractor builds federal highway using 30- and 36-in. concrete culvert pipe supplied by Tellyer Concrete Pipe Co.

By WALTER B. LENHART

UNITED STATES HIGHWAYS 70 and 80 that connect El Paso, Texas, with the West Coast are two of the more important highways in this country. Over these all-weather roads, passenger cars from all parts of the nation find their way to and from the West Coast. In the Las Cruces-Deming-Lordsburg, N. M., area a new stretch of black top highway is being constructed by Skousen & Hise of Albuquerque, that for the years to come will not only be an outstanding road, but will serve as an excellent advertisement for the materials being used, with concrete culvert pipe receiving the glow of the limelight. In a 20-mile stretch now under construction, some 52,000 lineal feet of 30-in. and 36-in. concrete pipe are being used for culverts. A Wisconsin road contractor who was present at the time these data were gathered told the writer "there is more concrete culvert pipe on this one job than there is in the whole state of Wisconsin."

The highly impressive part of this permanent advertisement for concrete culverts is the fact that in one place 183 parallel courses of 30-in. pipe are

laid. The illustration we show is one where 48 courses of 36-in. pipe are the high point. At another site some 78 courses of 36-in. pipe are featured. A large part of the credit for this job must be given to Harry Tellyer and his son, Pardon Tellyer, who have pipe plants in Albuquerque; Farmington, N. M.; El Paso and Odessa, Texas. The pipe on this job all came by truck from the El Paso plant and is standard T & G reinforced pipe made on a heavy duty Quinn machine. Deming is about 100 miles from El Paso.

The area being served by the new highway is flat and the soil is a sandy loam. On the older highway that parallels the new, many "dips" are present to slow down transcontinental traffic. In the newer highway these dips are being removed through the use of the concrete pipe culverts. The area is desert in character with elevations in the 4500-ft. range. When

rains do occur they are apt to result in flash floods.

The multiple courses of the culverts are intended to help spread out the mass of water that can come down one of these shallow arroyos, thereby reducing vertical erosion which, if the water was confined to a few channels, might do considerable damage to a highway. The saving to the tax payer for this type of highway, as compared to those with square and other types of culverts, runs into thousands of dollars.

The new highway has as its base course a sand-gravel-clay material that is processed at a point adjacent to where the pipe is being placed. Two Pioneer portable plants supply the material. One plant is a 46-VE Pioneer duplex that has a 10- x 36-in. jaw crusher, 22- x 44-in. rolls, a 4- x 12-ft. screen, and uses 30-in. belts. The second Pioneer plant is a 16-V featuring a 10- x 16-in. jaw crusher, 16- x 16-in. rolls, a 30-in. x 8-ft. screen, and 18-in. belts. The larger plant is handling 400 t.p.h. and the smaller one 200 t.p.h. at minus 1-in., although the amount of oversize in the pit-run is small. The first portable is driven by a Caterpillar D-17000 diesel and the smaller portable by a Twin City gas engine. Two Koehring Dumptrucks were in service at the time of inspection and these were being loaded by a Northwest dragline using a Hendrix perforated bucket.

The base course of the highway is extremely well compacted and the amount of this material over the culverts will total 18-in., which includes the thickness of the bituminous portion.

The trucks coming from El Paso loaded with pipe are dumped by the trucker to the soft, sandy soil. A Duo-Way Wagernmobile next picks up one of the pipe lengths with its fork and delivers it to a point near where it will be installed. The Wagernmobile is an interesting unit, for it has a fork

(Continued on page 176)



Fifteen lines of 30-in. pipe with twenty-six 4-ft. pipe per line after pipe have been laid, but before backfilling



End view of 48 courses of 30-in. tongue-and-groove concrete culvert pipe which go under the road. This photograph was taken after backfilling and after the road had been brought up to grade

RIGHT:

(1) Larger portable plant has 10- x 36-in. jaw crusher. (2) Smaller plant features 10- x 16-in. crusher. These plants are furnishing base course material for the new highway. (3) Pipe being used for culverts is trucked in, approximately 100 miles. Units are unloaded by one man who dumps them to the soft soil. (4) Combination fork lift truck, bulldozer and scarifier picks up pipe and hauls it to place of use. (5) Cranes lay the pipe at the rate of 1000 to 1260 lineal ft. per day. (6) Back filling over the pipe is done by dragline





Overall view of new ready-mixed concrete plant of Big Rock Stone & Materials Co. Batching facilities are located in tall structure, left. Cylindrical silo in center is for commercial truck loading of aggregate

STONE PRODUCER EXPANDS READY-MIXED CONCRETE OPERATIONS

Big Rock Stone & Material Co., Little Rock, Ark., has up-to-the-minute plant which features central dispatching control to speed up delivery and check quality of concrete

ONE OF THE INTERESTING developments in the rock products field over the past few years has been the outstanding growth of the ready-mixed concrete industry, not only in number of new plants, but in the number of older operators who have expanded facilities in order to cope with the growing demand for concrete of this type. These latter have had to discard the old concepts of what a plant should be and modernize entire set-ups to retain markets cultivated and nourished over many years.

The new ready-mixed concrete plant of the Big Rock Stone & Material Co., Little Rock, Ark., could be cited as one of the many examples of older companies which, during this year, placed in operation a new and strikingly efficient ready-mixed concrete plant, plus efficient facilities for truck loading of commercial aggregates.

The new, all steel and concrete plant of the Big Rock Stone & Material Co. is situated on the south bank of the Arkansas river in the heart of downtown Little Rock. Its location is between two concrete bridges that span the river, the Main Street and the Broadway bridges, over which flows a steady stream of local, state, and transcontinental traffic. As travelers enter the capital city of Arkansas via these bridges one of the dominant land marks is the new ready-mix plant with its neat and striking designs.

They cannot help but get the impression that here is an industry worthy of the name, and not just a collection of odds and ends thrown together to make concrete. The advertising and merchandising value of a neat, strategically located plant cannot be over-emphasized if one is to stress to his market that he is prepared to deliver concrete of the highest quality. If a person is given a preliminary impres-

sion that the plant has equipment of the highest order with which to make quality deliveries, it puts that plant in a far more advantageous position for sales than a plant that is not kept up. The new plant at Little Rock—it was just 40 days old when inspected—will unquestionably retain the leadership when ready-mixed concrete is mentioned in the areas that the Big Rock Stone & Material Co. serves. The



Crane unloads barges to storage pockets or to steel hopper serving belt to plant

new plant was designed under the supervision of Snow Wilson, Sr., president of the company, and Snow Wilson, Jr., vice-president and general manager. Other officials of this enterprising company are: W. E. Saeler, secretary, Joe Murphy, sales manager, and H. C. Kryer, manager of concrete plant and trucks.

The plant can be divided into two sections. The first comprises a steel, 4-compartment cylindrical bin, fed by a belt conveyor from which trucks load commercial aggregates. The second portion comprises the central mixing plant, and is served by a second belt conveyor that is fed from the first belt serving the truck bins. Cleanliness of plant and equipment is of the highest order.

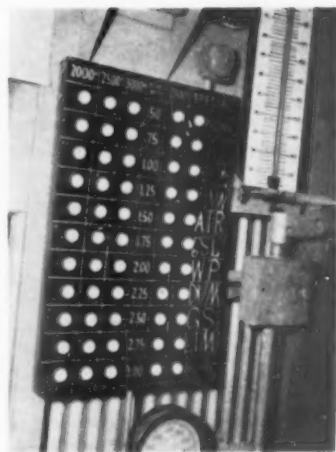
Batching

Another feature that helps to insure quality concrete is the use of two men in the batching plant. One operator works under the steel batching bins, weighing the aggregates and bulk cement using Blaw-Knox equipment. This operator drops the material to the 3-cu. yd. mixer below, where the second operator takes over, adds the water from a 6-ft. steel measuring tank, and otherwise sees that the concrete has the right mixing time, right slump, and sees that the material is loaded properly to the trucks. Water is measured into the Ransome mixer from a tank that features a 6-ft. long glass water tube gauge, suitably calibrated, and with a red background so that the operator can easily gauge the desired amount of water. A Darex dispenser is provided and its rate of delivery is based on "time of delivery." It was said that a flow period of 13 seconds for the Darex was equivalent to 1½ pints. The company can provide practically any other admixture that the trade desires. The plant has a capacity of 120 cu. yd. per hr.

Control Panels

Another novel feature of this modern installation is the electrical control panels that are used by the dispatcher to communicate with either the batcher or the pre-shrink section of the plant. The dispatcher's office is located in a separate structure away from the main office. In it is the control panel made up of a series of hand-operated switches. The dispatcher, by throwing several of the many switches, can indicate by small electric lights the type, yardage, and strength, or give other special instructions to the plant operator so he can prepare the desired concrete. In the plant, larger but similar panel boards are provided and these too light up similar to the smaller panel in the dispatcher's office. This efficient and highly serviceable system of communication was designed and built by the company.

When we asked how many salesmen the company had in the ready-mix department, plant manager Kryer said, in essence, "One on every truck—our



Left: Electrical control board through which dispatcher in field office can communicate either with batch operator, or operator of mixer in pre-shrink section. Right: Operator at controls of weigh batcher. Board in background is similar to one in dispatcher's office and tells the operator what to prepare.

truck drivers are our salesmen." The company has a total of 18 mixer trucks of various makes. Fifteen of the units are 3 cu. yd. and three are 6 cu. yd. These are mounted on truck chassis of many types.

The company operates a large crushed stone operation across the river from the new plant from where all aggregates are delivered by barges which have a capacity of 250 cu. yd. The company has five barges and two tow boats, the "Snow Wilson" and "Little Rock," both diesel-driven. Sand is dredged from the river by a 10-in. suction dredge. Unloading at the plant is by Clyde-Whirley crane that carries a 2½-cu. yd. Owens bucket. The Whirley can unload to pockets, or to a steel hopper serving the first belt conveyor to the plant. It is a 24-in. inclined belt, and is driven by a 25-hp. U. S. Synnergear motor. The belt is fed by a small gravity-type clamshell gate. This first belt delivers to the truck hopper or to a second inclined 24-in. belt that is powered by a 20-hp. U. S. Synnergear motor. This belt serves the bins over the batching plant. The Whirley can unload a barge in about 40 minutes. Bulk cement is used and is stored in a 4-compartment steel silo. Rotary gates control the cement, and air jets are provided to prevent packing in the bin. Details of the design and the construction of the plant itself were all carried out by the staff of the Big Rock Stone & Material Co.

Concrete from this plant is sold in Little Rock on a delivered price, for which the area is divided in five zones. The concrete is priced on strength considerations as well as zone. The electrical control panel designates 2000, 2500, 3000, and 3500 p.s.i. specified concrete, although a wide range of other and higher strengths can be prepared.

Add Features to Line of Continuous Mixers

YODER Co., Cleveland, Ohio, recently introduced a new type of continuous concrete mixer which is said to be revolutionary in design in that it incorporates a vibrating belt feeder which automatically adjusts aggregate to constant volume, regardless of moisture content. This machine, with a capacity of from 5 to 20 cu. yd. or more of concrete per hour, incorporates a non-clogging cement feed system to the mixer through a screw conveyor.

Alternate blades in the mixer trough are set at different angles so that the mix is assured of sufficient mixing time. In order to obtain a greater or smaller amount of mixed concrete, the only adjustment needed is to the main drive motor speed, as cement-aggregate ratio remains the same. Specifications of the mixer are: motor (main drive), 7½ hp. variable speed; vibrating shaft motor, ½ hp.; aggregate hopper, 6 cu. ft.; cement hopper, 2 cu. ft.; barrel length, 8 ft.; floor space required, 5 x 9 ft.

Admix Meter for Pavers

KOCHING Co., Milwaukee, Wis., has developed a meter specifically for automatically measuring a predetermined quantity of a liquid air-entraining agent into the concrete batch being mixed. Although designed for addition to the company's 16-E or 34-E Twinbatch Pavers, the unit is also suitable for use in connection with water batchers in ready-mixed or central-mixed concrete plants. Capacity of the meter is adjustable from 1½ to 20 fl. oz. in 1/10 oz. increments. A 40-gal. supply tank is included in the arrangement.



NOW!

WILLIAMS OFFERS A CHOICE OF

23

CEMENT & MORTAR COLORS!

Only Williams can offer you this broad selection of fine Cement and Mortar Colors. With a choice of 23 shades, you can quickly and easily get a color having chemical and physical properties which hit your color specifications "on the head".

IN CEMENT COLORS WILLIAMS

offers you a choice of 18 shades—6 Reds, 3 Greens, 3 Browns, 3 Yellows, 1 Black, 1 Blue and 1 Orange. Each shade is manufactured to meet the most exacting specifications for cement work as recommended by the American Concrete Institute and the Portland Cement Association.

IN MORTAR COLORS WILLIAMS

offers you a choice of 5 different shades—one shade in double strength red, light buff, dark buff, chocolate and black. Each of these colors may be used with excellent results with any standard mortar mix or with a ready-made Brick-layer's Cement.

Write today for color samples and complete technical information on how cement and mortar colors may be used for improved results. Address Department 10, C. K. Williams & Co., Easton, Pennsylvania.



WILLIAMS
COLORS & PIGMENTS

C. K. WILLIAMS & CO.

East St. Louis, Ill. • Easton, Pa. • Emeryville, Cal.

Culvert Installation

(Continued from page 172)

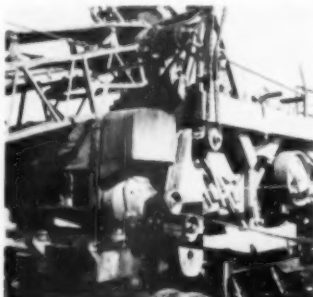
lift arrangement on one end and a combination bulldozer and scarifier on the other. It is mounted on three rubber wheels. Two rubber-mounted



This diesel drives larger portable plant

Michigan TMDT-18's (cranes) lay the pipe, and cement mortar joints are used. Bagged El Toro cement from the El Paso plant of the Southwestern Portland Cement Co. is being used. The crew laying the pipe consisted of 4 to 5 men, exclusive of the crane operators, who were very efficient in getting the pipe to exact grade and in making a good, smooth mortar joint. They would lay 1000 to 1200 lineal ft. per day. In some places only two or more courses would be laid so the rubber-mounted equipment, at the completion of one job, would rapidly proceed to the next. Backfilling over the pipe was by a Northwest dragline using a Hendrix bucket. The parallel courses were spaced a distance apart equal to half the diameter of the pipe, i.e., 15 in. for the 30-in. pipe, and 18 in. for the 36-in. units. The high salvage value of concrete pipe of this type is worthy of mention should engineers decide to build another type of highway in the same zone.

It is interesting to note that in New Mexico, road-mix bituminous road building practice is on its way out and is rapidly being replaced with plant-mix asphaltic concretes as it is said that this latter type of highway construction is giving better results there. This could be part of a trend in the Western areas where road-mixed



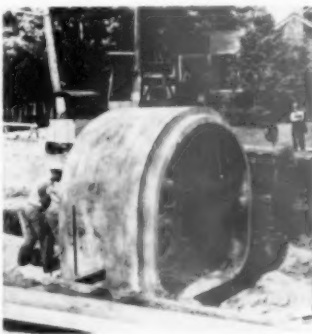
Closeup of drive on smaller crushing plant

bituminous practices have built many thousands of miles of exceptionally good highways.

This type of sales engineering as exemplified by this pipe installation cannot help but rebound to the credit of the entire concrete pipe industry, and at the recent San Francisco national pipe meetings one of the speakers, R. Robinson Rowe, bridge research engineer, State of California, showed a slide in which concrete culvert pipe could be nested, one course upon the next, in such a fashion that the assembly could replace small bridge structures. The speaker intimated that this was an elaboration on the culvert installation in New Mexico in which the Tellyers play such an important part.

Concrete Pipe Uses

UNIVERSAL CONCRETE PIPE CO., Columbus, Ohio, reports that its flat base reinforced concrete pipe is gaining use for cattle passes, pedestrian underpasses, culverts and utility galleries. Pipe used for cattle passes are said to be wide enough to permit a



Flat base reinforced concrete pipe

cow-with-calf to travel through but narrow enough to keep two cows from going through together and jamming. As pedestrian underpasses, the pipe are for promoting safety near schools. In culvert construction, the pipe conforms to the contour of the land and the flow of the stream. The pipe also is useful in eliminating road level crossings, long a major hazard of highway traffic. Other utility gallery uses of the pipe listed by the manufacturer are to protect electric cable, telephone lines, gas or water mains, yet provide ample room for workmen to make repairs and installations. The company operates plants in Alabama, Florida, Georgia, New Jersey, New York, Ohio, Pennsylvania, Tennessee and West Virginia.

TRI-COUNTY LUMBER CO., INC., Liberty, Texas, is constructing ready-mixed concrete plant to cost in excess of \$40,000. The batching plant will consist of a 32-ft. tower with a 100-ton bin on top. Two transit mix trucks will be placed in operation.

BLUE BRUTE USERS AGREE: "It's a Great Line of Mixers!"



FOR CENTRAL MIXING
This modern plant of the Clark Certified Concrete Company, Inc., of Baltimore, Md., produced 125,000 yds. of pre-mixed concrete during the past year. Vice-President Duncan writes: "Your Blue Brute 84-5 Stationary Mixer has proven entirely satisfactory. Maintenance costs have been practically nothing."



FOR PORTABLE MIXING
Le Roy W. Vival, chief engineer of the O'Sullivan Rubber Corporation, Winchester, Va., reports: "We are extremely gratified by our Blue Brute 3 1/2 Tiltting Mixer, which has had two years of constant, severe use. It is extremely mobile, well constructed and performs excellently. Long exposure has not decreased its efficiency. The mixing cycle is fast and the mix consistently uniform. It is a pleasure to endorse and recommend this equipment."



FOR TRANSIT MIXING
President Bob McCorkle of the Abilene, Texas, Concrete Company, gives his reasons for re-ordering Blue Brute Hi-Up Truck Mixers: "We have compared competitive makes on our jobs and find your Hi-Ups best in every way. Maintenance costs have been negligible. Just purchased your first chain-drive Hi-Up and find it even better than the older machines — faster charging and discharging, easier to maintain and smoother running."



FOR PLACING
In building the Washburn vehicular tunnel under the Houston, Texas, ship channel, the "Trench method" of construction was used. The last yard or two of concrete placed in each of the section joints had to be placed straight upwards — a tricky pouring problem. Merritt-Chapman & Scott Corporation reports an easy solution was found with the aid of a Blue Brute Pneumatic Placer, which performed excellently.

Yes, among Blue Brute owners it's a never-ending story of more concrete at lower cost, trouble-free operation, time and money saved in every detail of mixing operations. Why not look into this proof that *there's more worth in Worthington?* See your nearby Worthington-Blue Brute Distributor, or write for bulletins on mixer types in which you're interested.



BUY BLUE BRUTES

Worthington Pump and Machinery Corporation
Construction Equipment Department
Harrison, New Jersey

Distributors In All Principal Cities

WORTHINGTON



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

AIR VIBRATORS

**SAVE
YOUR
BINS**



LOW COST AIR VIBRATORS GUARANTEE STEADY MATERIAL FLOW OR SETTLE CONCRETE MIXES

Powerful hammer-like blows delivered by CLEVELAND Type "F" air vibrators prevent arching-over and plugging in bins, hoppers and chutes. These dependable units have been designed for use on all types of hoppers and bins handling sand, cement, cinders and all other granular materials.



Type "LSRR"

LSRR air vibrators utilize cast steel male wedge type mounting bracket which fits the female bracket that is standard equipment on most covered hopper railroad cars. In addition, female brackets can be furnished for attachment to bins, concrete forms, chutes, etc., and a single LSRR vibrator can be moved from one installation to another to handle several different applications.

New vibrators featuring a portability and rapid, easy attachment to wooden studs or metal structural members are now available. These units are recommended for use on concrete forms, hoppers, bins, dump trucks, etc. to settle or shake-out their contents.



Type "UH"

These CLEVELAND air vibrators and many others are illustrated and described in the new CLEVELAND VIBRATOR catalog. Write today for your copy.

**THE CLEVELAND
VIBRATOR CO.**

2809 Clinton Avenue
CLEVELAND 13, OHIO



NEW MACHINERY

Lightweight Truck Mixer

T. L. SMITH CO., Milwaukee, Wis., announces new Load Limit models of its Smith-Mobile truck mixers. These new machines are said to haul full

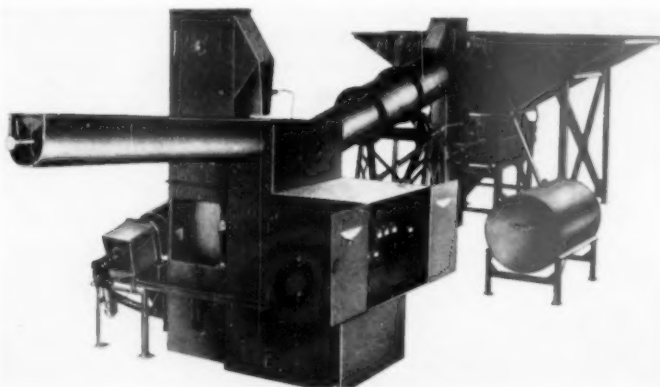


New model truck mixer designed to meet highway weight restrictions

rated truck mixer payloads and still meet the highway load limitations imposed by most states. Reduced weight is realized through elimination of parts and assemblies which are not basic or necessary to mixer operation. A standard model can be quickly converted to a Load Limit model in the field, or vice-versa. The new mixers are available in 2-, 3-, 4½- and 5½-cu. yd. mixer capacities, with higher ratings for agitators.

One-Man Hot-Mix Plant

WAYNE CRANE DIVISION, American Steel Dredge Co., Inc., Ft. Wayne, Ind., is now in production of its Wayne Monotrol Model M-20, a new continuous hot-mix plant designed for one-man control. All functions of the plant are electrically operated from a single control panel. The entire plant is built in sections for ease of assembly on the job or to facilitate a change in plant location. Positive control of the quality of the mix is the most important feature of the new plant, ac-



Bituminous hot-mix plant designed for one-man control

cording to the manufacturer, who further states that this is possible through accurate proportioning and mixing of the materials, which in turn is ensured by several patented mechanical devices.

Raw aggregates are proportioned to the mix by means of individual volumetric-type feeder valves under each bin compartment. The rotary dryer is of the three-section type. Addition of the bituminous mixture is controlled by a pump-control device.

Automatic Block Machine

MULTIPLEX MACHINERY CORP., Elmore, Ohio, is now in production of two new models of its Multico automatic block machine. These machines form two or three block per cycle, four cycles per min. Feature of this hydraulically operated machine is the "Power Pack," a separate, fully enclosed cabinet containing all power sources and controls, including hydraulic pump and necessary motors. Plain pallets are used on this machine



Fully automatic, hydraulically-powered block machine with all controls and power sources located in fully enclosed separate cabinet, right

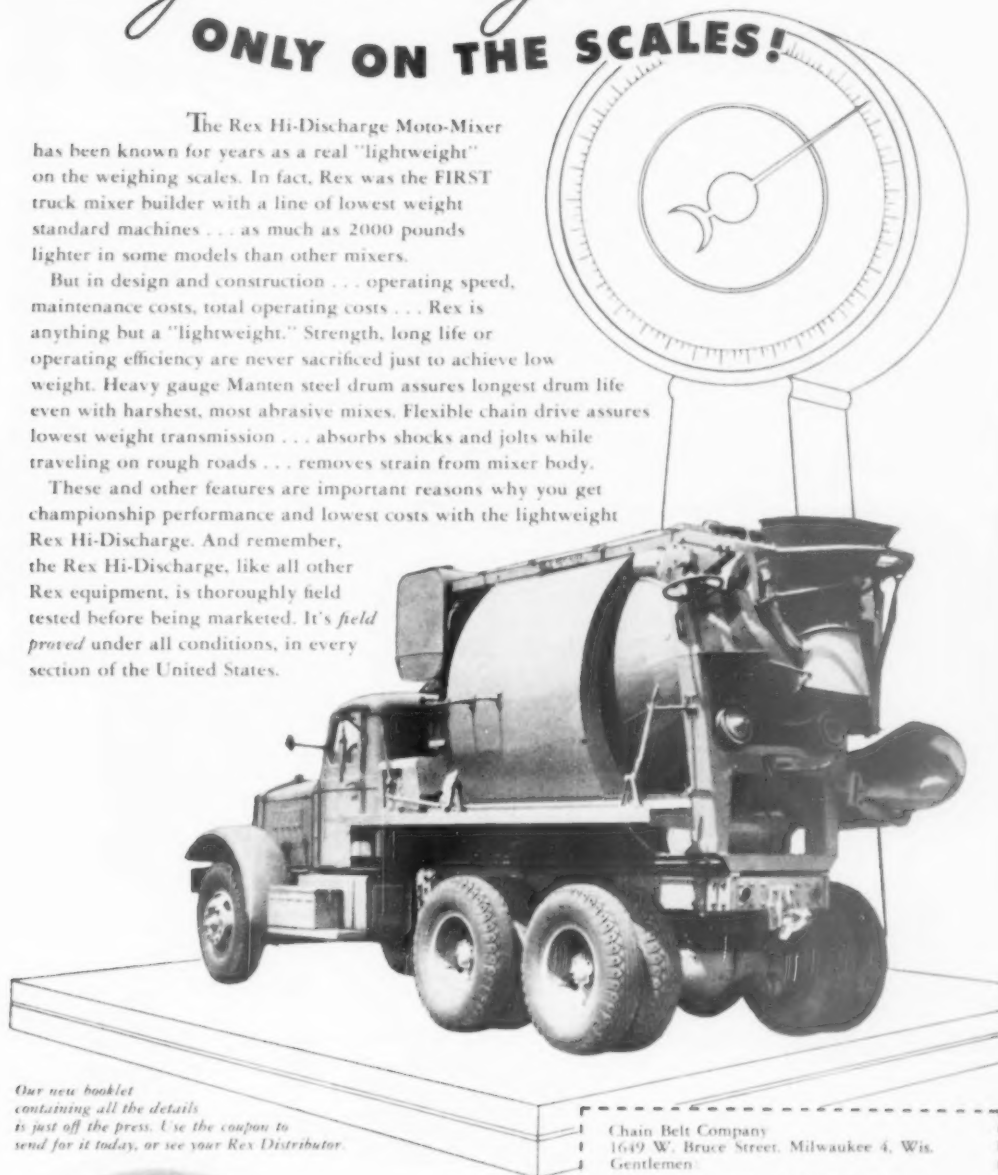
which produces all sizes and shapes of block, modular as well as special, employing both pressure vibration and tamping.

A "lightweight" ONLY ON THE SCALES!

The Rex Hi-Discharge Moto-Mixer has been known for years as a real "lightweight" on the weighing scales. In fact, Rex was the FIRST truck mixer builder with a line of lowest weight standard machines . . . as much as 2000 pounds lighter in some models than other mixers.

But in design and construction . . . operating speed, maintenance costs, total operating costs . . . Rex is anything but a "lightweight." Strength, long life or operating efficiency are never sacrificed just to achieve low weight. Heavy gauge Manten steel drum assures longest drum life even with harshest, most abrasive mixes. Flexible chain drive assures lowest weight transmission . . . absorbs shocks and jolts while traveling on rough roads . . . removes strain from mixer body.

These and other features are important reasons why you get championship performance and lowest costs with the lightweight Rex Hi-Discharge. And remember, the Rex Hi-Discharge, like all other Rex equipment, is thoroughly field tested before being marketed. It's field proved under all conditions, in every section of the United States.



Our new booklet containing all the details is just off the press. Use the coupon to send for it today, or see your Rex Distributor.

CHAIN BELT
REX
COMPANY

CONSTRUCTION MACHINERY

Chain Belt Company
1649 W. Bruce Street, Milwaukee 4, Wis.
Gentlemen:
Please send me a copy of Bulletin 50-11.

Name

Company

Address

City State

Roof Tile Machine

BESSER MANUFACTURING Co., Alpena, Mich., has announced the Besser-Anza fully-automatic roof tile machine for production of 16 to 24 tile per min. The tile measure 10 x 16 1/4 in. Automatic operation of the machine includes: application of head-check in manufacture; pallet feeding and loading of pallets; oiling of pallets; eccentric roller action knits concrete; coloring of tile in manufacture; and feeding of aggregate (permits use of minus 1/4-in. aggregate).

According to the distributor, tile produced are outstanding in durability, are fireproof, need no upkeep, improve with age, are storm and rat proof, and blend with any style of architecture. They are reported to be true and perfect in shape, uniform in size, allowing unskilled labor to lay them.

The tile machine has been in use in New Zealand and Australia for the past 10 years. It is marketed in America solely by Besser Manufacturing Co.

High Discharge Mixer Body

CHAIN BELT Co., Milwaukee, Wis., recently developed the adjustable-discharge Moto-Mixer, a horizontal drum-type truck mixer for ready-mixed concrete operation, that includes a high-discharge feature by virtue of a hydraulic elevator system on the



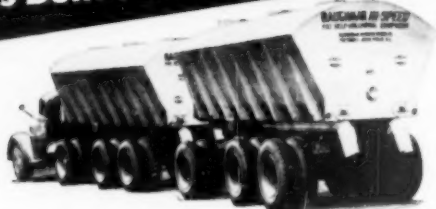
Shop floor showing assembly-line like operation of new automatic roof tile machine

drum. Discharge height of this mixer may be spotted at any point between 60 and 79 in. above road level. Additional features include chain drive for drum, Manten steel drum and mixer blades, enclosed water system, non-clogging water nozzle and fluid drive for mixer-power connection, according to the manufacturer. It is claimed that the unit combines fast, thorough mixing, fast charging, fast discharging and economical operation.

Concrete Block Grinder

GARDNER MACHINE Co., Beloit, Wis., is producing the No. 120A-30 in. Gardner Double Spindle Grinder with 30-in. wheels, two 25-hp. or 30-hp. motors. The grinder consists of a heavy cast-iron base carrying the grinding heads and motors with a welded steel hood provided with adequate exhaust opening. The grinder also has a bar-type wheel dresser with ball bearing cutters and an endless double-chain con-

**It's Economical...It's Practical...
It's Built for the Job!**



Baughman BULK CEMENT TRANSPORT

Self Unloading . . .

Designed specifically for cement transport. Low in cost because of modern engineering and production methods. Built of high tensile alloy steel for more strength with less weight, giving MORE PAYLOAD. Waterproof man-holes spaced for capacity loading. Cat-walk top . . . climbing ladder. Electro welded throughout. Available in 15' to 33' lengths.

Twin screws give fast action . . . covered with special air cells for easy starting and high speed discharge. Equipped with powerful motor . . . all controls conveniently located on outside of body. Simple . . . positive . . . immediate.

Write for full details on the Baughman Line of transport bodies and conveyors.

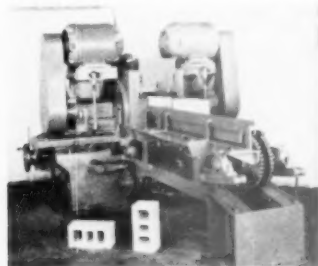


BAUGHMAN MANUFACTURING CO., Inc.

661 Shipman Road

Jerseyville, Illinois

"There is a Baughman Distributor Near You"



Concrete block grinder adjustable to all sizes of block

veyor with adjustable rails and guides for all sizes of concrete block. The head may be tilted both vertically and horizontally for adjustment. There also is, according to the manufacturer, ample vertical adjustment of the conveyor for passing block through the machine on center-line of abrasives. Production with the machine is about 15 standard block per minute, removing 2/16-in. total stock.

Water-Repellent Coating

THE RANETITE MANUFACTURING Co., Inc., St. Louis, Mo., has announced the improvement of Ranetite No. V. This transparent water-repellent coating is applied to outside masonry walls, above grade, to improve resistance to water and dampness.

Meter for Testing Air Entrained Concrete

CHARLES R. WATTS & Co., Seattle, Wash., has made available the Pressure-meter for determination of the air content of concrete. The unit makes



Meter for determination of air content of concrete

a complete test in three minutes, faster than any other meter, according to the manufacturer. It follows the Klein-Walker application of Boyles Law, simplifying the usual testing procedure by using only about one tablespoon of water added on top of the sample to insure accuracy. No adjustments for varying barometric pressures are necessary, and computation or special training are not required to operate the meter, the firm states. A direct reading in percent of air can be made. Low cost, light weight of 19 lb. and a capacity of $\frac{1}{4}$ cu. ft. are claimed also.

Concrete Test Cylinder Molds

MOLINE IRON WORKS, Moline, Ill., is producing a line of concrete test cylinder molds said to meet all pertinent A.S.T.M. requirements and produce specimens for compression testing which are uniform and consistent as to dimensions and truly typical and representative of the concrete being tested. The molds are available in two stock sizes: 6 x 12 in. to test concrete containing aggregate not exceeding 2 in., and 8 x 16 in. to test concrete containing aggregate exceeding 2 in. in size. Various special sizes also are manufactured. The body halves are bored to exact dimensions and bottoms are accurately machined producing test cylinders that are always round with flat ends, the firm states. The molds are made of high strength heat-treated malleable iron castings with bronze swing bolts for long

3000 READY-MIXED PLANTS ASKED FOR IT a lighter, faster truck mixer... hundreds of dollars lower priced



FLUID DRIVE
(if you want it)

JAEGER "PAYLOADER"

2-3-4 $\frac{1}{2}$ -5 $\frac{1}{2}$ YD. SIZES

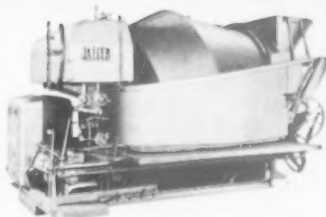
600 to 1600 lbs. weight reduction, meets strict load limitations: Yet sturdier, more rugged in frame and vital parts than ever before.

9 to 13 inches shorter, for better truck mounting: Less cab-to-axle requirement for short wheelbase trucks, correct load centering on all models for long truck and tire life.

Faster in operation — more trips, pay-loads per day: 10 seconds per yard to end load dry materials with new hopper and high drum "charging" speed. Top load wet material in one shot thru quick opening "toggle lock" door.

One wheel turn fully retracts hopper for discharge. High drum "discharge" speed thru Jaeger 2-speed transmission, plus low angle discharge cone and continuous blades, discharges 4" slump concrete at 20-25 seconds per yd., 1" slump in 60 seconds.

Pressure-jetted water distribution and 2-speed "Dual Mixing" with "Throw-Back Blades," insure higher strength concrete: The reason more concrete is sold by Jaeger Truck Mixers than by any other method.



**50% LOWER MAINTENANCE COST
... MORE HOURS ON THE ROAD**

New "Spider" drum drive: Saves weight, insures an always self-aligning drum.

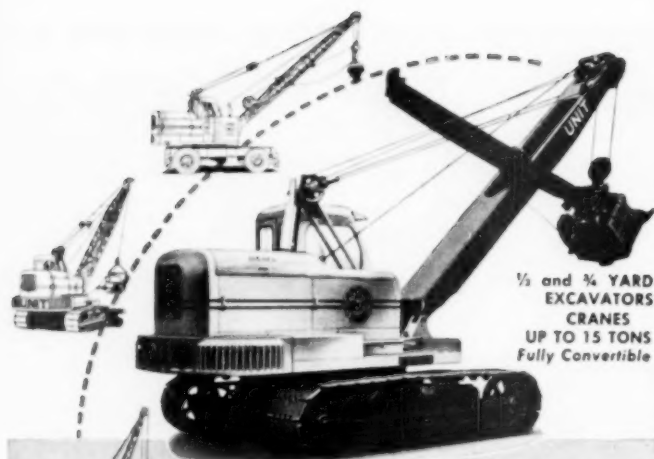
Unit power and transmission: A major improvement. Permanent gear alignment.

Instant opening, self-aligning hopper, long-life seal: Eliminates all end loader headaches. One wheel turn retracts hopper 9" for discharge. Self-centering drive pins hold it in positive alignment on roughest ground. Seal self-lubricated from 5 lb. grease reservoir. Seal replaceable in 30 minutes without removing hopper.

Ask your Jaeger distributor to show you these and many other
Jaeger-engineered improvements—or send for complete Catalog TMH-10

THE JAEGER MACHINE COMPANY, Columbus 16, Ohio

AIR COMPRESSORS • PUMPS • MIXERS • HOISTS • TOWERS
AGGREGATE SPREADERS • BITUMINOUS PAVERS • CONCRETE SPREADERS, FINISHERS



1/2 and 3/4 YARD
EXCAVATORS
CRANES
UP TO 15 TONS
Fully Convertible

UNIT BUILT FOR ALL-AROUND Heavy-Duty Service

UNIT is tough! UNIT is versatile! That's why you can use UNIT on any type of job requiring shovel, clamshell, magnet, dragline, trencher, grapple or backfiller. And it's easy to change from one attachment to the other, right on the job. UNIT gives

you all the power and speed you need, plus these exclusive features: Automatic traction brakes . . . Disc-type clutches . . . Drop forged alloy steel gears . . . Splined shafts . . . One-piece cast gear case . . . Straight-line engine mounting. Mobile and Crawler Models Available

UNIT CRANE AND SHOVEL CORP.

6431 W. BURNHAM ST., MILWAUKEE 14, WIS., U. S. A.

FULL VISION CAB
for
GREATER
SAFETY



UNIT

SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • TRENCHERS • MAGNETS

A 5066 1/2 ICA R



Type "MR" 3 1/2' x 8' Double-deck

IT WILL PAY YOU TO INVESTIGATE

UNIVERSAL

HIGH-SPEED VIBRATING SCREENS BEFORE YOU BUY!

1950 MODELS OFFER STEPPED-UP CAPACITY ON YOUR MOST DIFFICULT SEPARATIONS.

Get the facts on this popular Vibrating Screen today! Catalog No. 109 on Screens and Screening.

UNIVERSAL VIBRATING SCREEN CO.

RACINE - WISCONSIN

Concrete Testing Machine

THE YODER CO., Cleveland, Ohio, has designed a 100-ton concrete testing machine for use by ready-mixed concrete and concrete products manufac-



Simple concrete testing machine

turers in their own plants. Brick and block up to 8 x 8 x 16 in. and 6-in. cylinders can be tested with the machine. The manufacturer claims this machine to be rugged, durable, accurate, simple and easy to operate even by men who have had no previous experience in this kind of work. In addition it meets all the essential requirements of A.S.T.M. specifications for such machines.

Repairing Process for Engine Blocks and Heads

THE C. F. C. Co., Madisonville, Ky., has announced a new process for repairing broken and cracked cast iron engine blocks and heads, which employs neither a weld or a sealing compound. The patented process uses the same material as was used originally in the cast iron block or head. According to the company, the process has been proven for the past five years without a failure in all types of gasoline and diesel engines.

Lift Trucks with Four Reverse Speeds

ERICKSON POWER LIFT TRUCKS, INC., Minneapolis, Minn., has made available a unit featuring four reverse speeds as well as the usual four forward speeds. The four-speed unit is available on all new trucks at small extra cost or may be added to previous models already in service, according to the manufacturer. Four reverse speeds are said to be especially valuable with either platform or fork trucks in handling racks of block in and out of kilns as the truck travels just as fast in reverse as in forward.

Multiple Use Protective Coating

END-O-RUST, INC., Cleveland, Ohio, has developed End-O-Rust, a corrosion and oxidation resistant coating created primarily for use on metals. Because of its sealing power, however, it has been adapted with special success for use on concrete, wood, fibre or any surface where more than normal protection is needed.

No special preparation of surfaces is required with End-O-Rust, the firm states. It will air dry for handling in two to three hours, force dry within 30 min. and infra-red bake in three to five minutes. This product has a high hard gloss finish, impervious to abrasion, weathering and hard wear. The manufacturer especially recommends it for coastal areas for withstanding dampness, humidity or salt air.

Overload Release

AMERICAN PULLEY CO., Philadelphia, Penn., has perfected a new mechanical overload release to protect machinery against shocks and overloads. The release is applicable to practically all types of slow-speed machinery including elevators, conveyors, mixers, etc. The device is quickly installed without any alterations to the drive, and affords positive, instantaneous protection against damage to equipment caused by choke-loads, overloads, frozen bearings, etc. Overload release automatically disengages itself and can be reset quickly by the operator.

Concrete Sewer Pipe Gasket

UNIVERSAL CONCRETE PIPE CO., Columbus, Ohio, has perfected a 100 percent crude rubber gasket for use in concrete sewer pipe joints. It is



Crude rubber concrete pipe gasket

claimed that when the Hexoseal gasket is properly installed with dimensionally accurate concrete pipe, the result is a flexible line that resists infiltration, exfiltration and roots. The new gasket meets A.W.W.A. specifications.

Clear Anti-Rust Paint

SPECO, INC., Cleveland, Ohio, has added a new clear anti-rust paint to its Rustrem (Rust Remedy) line of maintenance coatings. Rustrem Clear, as the new product is known, can be applied over rust without wire brushing or scraping, and can be painted over with any good quality paint (except lacquer), according to the manufacturer.

Hydraulically Powered • Fully Automatic Labor Costs Slashed to Less Than 1¢ per Block

EXCLUSIVE FEATURES

- Separate Power Pak Control Cabinet
- Pressure Vibration Plus Tamping
- Handles all Aggregates
- Makes all Sizes and Shapes of Block

Yes, the trend is to Multico—28 new Block Masters have been installed in the past 3 months. 28 more plants can now step up production, fill orders faster and easier with a higher quality block at lower labor costs. The **MULTICO BLOCK MASTER** is completely automatic—just set the controls and **BLOCK MASTER** takes the aggregate, vibrates on pressure, then automatically tamps block to size, all in one operation—an exclusive **MULTICO** feature. The **BLOCK MASTER** is a standard production machine. The separate power pak can serve additional machines—another saving. The **BLOCK MASTER** uses plain steel pallets, enabling you to produce any size or type of block desired. Let a Multico Field Engineer assist you in layout and planning of your plant. This is a free Multico service backed by 45 years of know-how and experience. Learn first hand why 28 new Multico equipped plants have been started in just 3 months.

Write for Free Catalog or Location of Nearest Machine in Operation.

MULTIPLEX MACHINERY CORP.

ELMORE
OHIO

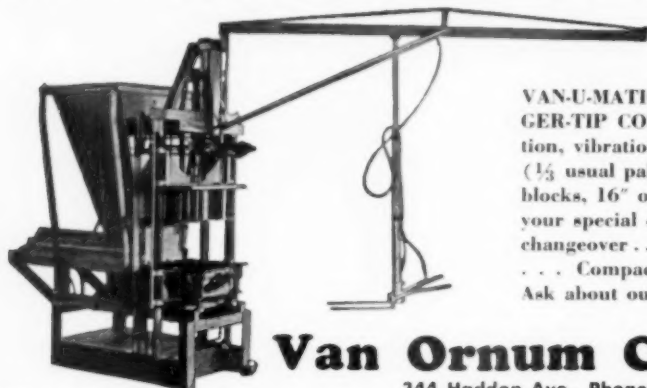
MANUFACTURERS OF BLOCK MACHINES • MIXERS • SKIP HOISTS • STRIPPERS • ELEVATORS

Different... Sensational... WORK THE FIRST DAY AND THEREAFTER

\$4300.00!

HOW CAN SO LITTLE MONEY BUY SO MUCH!

400 BLOCKS
PER HOUR



VAN-U-MATIC has ALL the features . . . "FINGER-TIP CONTROL" pneumatic power operation, vibration and off-bearer . . . Plain pallets ($\frac{1}{3}$ usual pallet investment) . . . Makes all size blocks, 16" or 18" lengths, modular sizes or to your special core requirements . . . Quick easy changeover . . . True dimensional, perfect blocks . . . Compact . . . Easy to install and clean. Ask about our new 3 unit machine.

Van Ornum Co. Westmont, N. J.

344 Haddon Ave., Phone COLLingswood 5-4767

VAN-U-MATIC BLOCKMAKER

DEMONSTRATION PLANTS AND REPRESENTATIVES

Tabin Bros. Florence, Mass.	John Haessler Con. Prod. BuWalo, N. Y.	G. W. Robertson Hillsdale, N. Y.	Pumicrete Sales Co. Fresno, Calif.	F. H. Yanks Chester, Pa.	Wakeman Associates Lakeland, Fla.
Gardell Associates, Inc. Union City, Mich.	E. M. Wakeman Lakeland, Fla.	Northeast Con. Prod. Northeast, Md.	Maysville Con. Prod. Maysville, Ky.	Jockle Con. Prod. Oklauchee, Wis.	

FREE SERVICE for BUYERS

Here is the quick way to get information and prices on machinery and equipment. Just check the item (or items) listed below about which you desire information. Then send this page to us, and we will take care of the rest.



Administrators, Aggregate
Aftercoolers, Air
Aggregate (special)
Air Compressors
Air Separators
Asphalt Mixing Plants
Bagging Machines
Bages
Barges
Batches
Belting, Conveyor,
Elevator, Power
Transmission
Belting, V-Type
Belt Repair Equipment
Bin Level Indicators
Bins and Batching
Equipment
Machine Supplies
Block Machines
Concrete Building
Bedies, Trailer
Brick Machines and
Molds
Buckets
Buildings
Cars, Industrial

Classifiers
Catches
Coal Pulverizing
Equipment
Concentrating Tables
Concrete Mixers
Concrete Mixing
Plants
Concrete Specialty
Molds
Concrete Waterproof-
ing and Dampproof-
ing
Conveyors
Crashers
Coolers
Cranes
Decorates
Dewatering Equip-
ment, Sand
Diesel Engines
Dragline Cables
Excavators
Draglines
Dredge Pumps
Drilling Accessories
Drills

Driers
Dust Collecting
Equipment & Sup-
plies
Electric Motors
Engineering Service,
Consulting and De-
signing
Explosives & Dynamite
Fans and Blowers
Flotation Equipment
Gasoline Engines
Gear Reducers
Generator Sets
Grinding Media
Gypsum Plant Ma-
chinery
Hard Surfacing Ma-
terials
Hoists
Hoppers
Kilns: Rotary, Shaft,
Vertical

Locomotives
Lubricants
Mills
Pulverizers
Pumps
Seals
Screen Cloth
Screens
Serubbers; Crushed
Stone, Gravel
Shovels, Power

Speed Reducers
Tanks, Storage
Tractors
Trucks, Industrial
Trucks, Mixer Body
Trucks, Motor
Vibrators
Welding & Cutting
Equipment
Winches
Wire Rope

If equipment you are in market for is not listed above, write it in the space below.

Your Name _____ Title _____
Firm Name _____
Street _____
City _____ State _____

Send to:

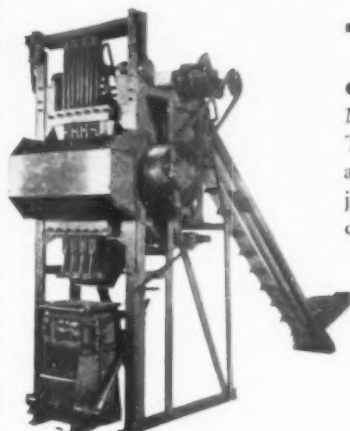
**Research Service Department
ROCK PRODUCTS**

309 W. Jackson Blvd.

Chicago 6, Illinois

CP-6

Add *VIBRATION* to the MOLD BOX — GET DENSER, STRONGER BLOCKS — IN INCREASED QUANTITIES



● Kent Vibrator Attachment built in the Tamper-Stripper Machine insures a denser, more uniform, better textured block. This is due to a very efficient vibrating action of the mold box and cores of the Stripper. . . With the Vibrator working in conjunction with the Tamper, the rate of production is stepped up decidedly, thus reducing the cost per block. . . This valuable device is standard on all new installations. *To our old Tamper-Stripper customers, we offer rebuilt Strippers with vibrators in exchange for the old Stripper at a nominal cost.*

Since the *cost is small* compared to the results to be obtained, why don't you write immediately for complete information.

The **KENT MACHINE CO.** Cuyahoga Falls, Ohio
Manufacturers of CONCRETE PRODUCTS MACHINERY Since 1925

PENN-DIXIE CEMENTS



PENNSYLVANIA-DIXIE CEMENT CORPORATION

OFFICES

NEW YORK, N. Y. NAZARETH, PHILADELPHIA, PITTSBURGH, PA.—BOSTON, MASS.
ATLANTA, GA.—DES MOINES, IOWA—CHATTANOOGA, TENN.

PLANTS

BATH, NAZARETH, PENN. ALLEN & WEST WINFIELD, PA.—RICHARD CITY & KINGSFORD, TENN.
CLINCHFIELD, GEORGIA—WEST DES MOINES, IOWA

WE ARE FROM MISSOURI!
LET US "SHOW YOU"
WITH VISIBLE MIXING...



FOR DRY BATCHING PLANTS OR CENTRAL MIXING PLANTS

CONCRETE TRANSPORT MIXER

CO. INC.

4987 FYLER AVE. ST. LOUIS, MO.

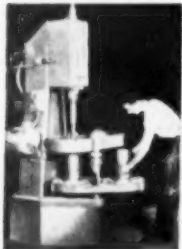


CEMENT DRAIN TILE

Money-Making Manufacturing Opportunity

Today's tremendous demand for drain tile opens up a choice field for the wide-awake concrete products manufacturer. Either as a business by itself or as a profitable addition to the regular line.

The Champion machine makes all sizes of tile up to 12-inch diameter. With such a range you can supply not only the huge farm market, but many others where drain tile is urgently needed—reclamation projects, home building, road construction, subdivision activities, etc.



Low Cost—High Profits

Tile made on the Champion are outstanding in quality—dense, strong, uniform. Far better than clay tile yet can sell for less—even after allowing a handsome profit. Machine is simple, compact, easy to operate.

Get the facts. Write for interesting literature about the business and the moderate priced equipment.

CONCRETE EQUIPMENT CO.
 562 OTTAWA AVE., HOLLAND, MICH.

FIRESAFE FLOORS—

Built With
 Vibrapac Soffit Floor Units
 on Acrow Floor Centers



HERE'S WHAT ACROW ADJUSTABLE FLOOR CENTERS WILL DO—

- 1 Provide temporary horizontally suspended shoring so that floors and roofs can be constructed with Besser Vibrapac concrete block.
- 2 Make Besser Vibrapac Soffit Block a firesafe, economical, desirable and saleable concrete masonry floor unit.
- 3 Completely eliminate all timber shoring, leaving all clear the space below floor while under construction.
- 4 Greatly reduce labor and other costs over conventional methods of shoring with lumber for concrete floor construction.
- 5 Reduce time usually required for floor laying. Work goes on in clear space below while upper floors are being built with Acrow Floor Centers and Besser Vibrapac Soffit Block.
- 6 Produce a ceiling surface of acoustical and insulation value that can be left exposed, painted or plastered.
- 7 Especially adapted for radiant heating installations.

Acrow Floor Centers Are Supplied By
BESSER MANUFACTURING CO.

Complete Equipment for Concrete Products Plants.

115 - 50th STREET ALPENA, MICH., U. S. A.



5 *Ericksons*

Now Owned by Gage Bros.

We quote from a letter to us by Gage Bros. Concrete Products Co., Inc., Sioux Falls and Aberdeen, S. D. "After coming back from our Aberdeen plant I can't say enough good about our two new Erickson high-lift trucks, making five we have purchased. For maneuverability, sturdiness and performance over almost any type of yard I don't see how anyone can afford to be without one in a concrete block plant. Everything is in a neat pile, we save a lot of yard space and much confusion. Inventories are a snap to take now, all we do is check the number of cubes."

Erickson POWER LIFT TRUCKS, Inc.

1405 Marshall St. N. E. • Minneapolis 13, Minn.

The **PERFECT BALANCE** of a **GERLINGER** *Pays off* ...on Jobs Like This!



**Here's why GERLINGER'S
COUNTER-ACTIVE
WEIGHT DISTRIBUTION
is important to YOU!**

There is no excessive counterweight to teeter weight away from the driving wheels on a Gerlinger. Exclusive balanced weight distribution allows front wheels to obtain maximum traction and braking power at all times... assures longer tire life and eliminates the extreme frame strain experienced in short wheelbase lift trucks where heavy counterweights are used. Compare such job-proven features and you'll find Gerlinger Lift Trucks lead all others.



**GERLINGER CARRIER CO.
DALLAS, OREGON**

LITH-I-BLOCK
A TWO OR THREE-BLOCK PLAIN
PALLET AUTOMATIC MACHINE

FEW MOVING PARTS — LOW MAINTENANCE — DEPENDABLE OUTPUT OF 8 OR 12 PRECISION BLOCK PER MINUTE

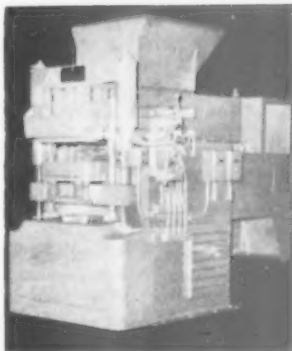
Write **LITH-I-BAR COMPANY**
HOLLAND, MICH. DEPT. CP-3

**YOU'LL MAKE MORE BLOCKS
WITH A *Columbia!***

**HERE'S
WHY**

- PLAIN PALLETS
- VIBRATION PLUS COMPRESSION
- 4 6 AND 8 INCH HIGH BLOCKS
- 4 TO 6 PALLETS PER MINUTE
- OIL HYDRAULIC
- ANY TYPE OF AGGREGATE
- AUTOMATIC OR SEMI-AUTOMATIC

• WRITE TODAY
FOR COMPLETE
INFORMATION



***Columbia* MACHINE WORKS**
105 MAIN STREET • VANCOUVER, WASHINGTON

Processing Plants for **PERLITE**

• MAXIMUM PRODUCTION

Operates continuously at approximately thirty 4 cu. ft. bags per hour. Full automatic temperature control. Automatic operation from feed hopper to bag. Built-in dust control system.

• MINIMUM COST

Only one man required to operate! Efficient design makes possible low initial cost. Operates on light grade oil or any gas, and low pressure (16 oz.) air.

• TOP QUALITY PERLITE

IT'S LIGHT!

8-10 pounds per cubic foot.

IT'S SHARP!

Perlite particles are sharp like good plaster sand.

IT'S WHITE!

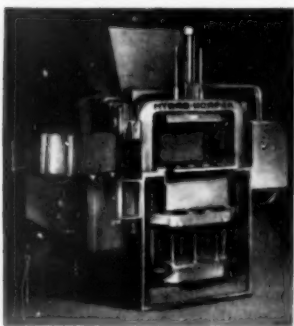
Perlite is of maximum whiteness. Plant will not discolor material.

For Additional Information Request Catalog C1210

See The Johnston Plant in Operation!

OVER THIRTY YEARS EXPERIENCE
IN FURNACE DESIGN & MANUFACTURE

JOHNSTON MANUFACTURING
COMPANY
2825 EAST HENNEPIN AVENUE • MINNEAPOLIS 13, MINNESOTA



**1-MAN
OPERATION**

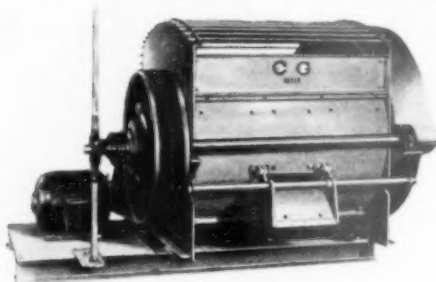
The New **HYDRO-KORPAK**

- Streamlined compactness.
- Pre-densifying by oscillating cores.
- Electrically controlled hydraulic movements for feeding, packing, stripping.
- Combines lateral and vertical compacting, giving uniform density all through.
- Modular conformation in all dimensions.
- Priced to be within reach of men of modest capital.
- Write for new descriptive catalog.

CONCRETE EQUIPMENT CO.
561 Ottawa Ave. • Holland, Michigan

THE FAMOUS C. G. MIXER

Sizes . . 14 . . 24 . . 36 . . 50 cf capacity



Equipped with . . .

Abrasion Resisting steel liners

Seal Master Ball Bearings

Famous Lemley clutch

Motor and V. belt drive or
clutch pulley drive

Write for literature and prices

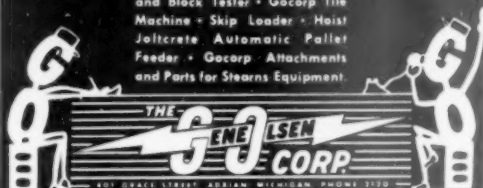
CHAS. GATZKE MFG. CO.

930 North Avenue . . . Des Plaines, Illinois

WRITE OR PHONE

for full information on
GOCORP BLOCK MACHINES

Gocorp Clipper • Batch Mixer
Gocorp-Yoder Continuous Mixer
and Block Tester • Gocorp Tile
Machine • Skip Leader • Hoist
Joltcrete Automatic Pallet
Feeder • Gocorp Attachments
and Parts for Stearns Equipment.



CONCRETE BURIAL VAULTS

AMERICA'S FINEST MOLDS AND LOWERING DEVICES



BERG VAULT CO.

EQUIPMENT DIVISION
1600 LUCAS HWY. RD., ST. LOUIS 20, MO.

CLASSIFIED ADVERTISING

FOR SALE

1 Stearns 15. Excellent condition. Must sell immediately. Priced attractively. See this machine now in production. Will show past production records.

STANDARD BLOCK & SUPPLY
Lansing, Michigan

FOR SALE

1 1/2 yd. Osmond Crane mounted on Diamond T. 600-800 hours on crane—Unit 2 yrs. old.
2-2 1/2 Ton G.M.C. Trucks 436 Good Condition. \$350.00 each.
125-Lewis-Shepherd Skid Platforms 3'x6" with 1" under clearance. Like New. \$5.25 each.

McNAMEE READY MIX CONCRETE COMPANY
P.O. Box 173 Xenia, Ohio
Phone 937

ANTHRACITE CINDERS

A car load or a train load. Our supply is unlimited. Processed ready to use. Locations in Baltimore & Ohio, Pennsylvania, and Lehigh Valley Railroads. Call or write

ROY P. McMINDES COMPANY
105 Macco Avenue Baltimore 21, Md.
Phone: Essex 179

BIG SAVINGS ON USED CONCRETE BLOCK MACHINERY

We buy and sell

Concrete Mixers, Hoppers, Power Block Machinery, Leading Makes, Pressed Steel Pallets, Accessories. Big Values offered. Write us your requirements.

GENERAL ENGINES CO., INC.
307 Hunter St. Gloucester 9, N. J.

FOR SALE

Used, Concrete Equipment Co., of Holland, Mich. Success Power Block Machine, with complete molds. Also 25 metal racks of 48 regular block capacity. Details on request.

CAMERON JOYCE & SCHNEIDER
Keokuk, Iowa

FOR SALE

Crushed and sized cinder aggregate, tested and approved for the manufacture of cinder blocks. Write:

DULUTH CINDER SLAG & STONE CO.
Box 116 Duluth 7, Minn.

CEMENT COLORS—Write for samples and prices of "LANSCO" CEMENT COLORS in bright shades of RED, YELLOW, GREEN, BLUE, BLACK, BROWN. Manufactured by

LANDERS-SEGAL COLOR CO.
73 Delevan St. Brooklyn 31, N. Y.

CONCRETE BRICK COLORS CEMENT COLORS MORTAR COLORS

made by
BLUE RIDGE TALC CO., INC.
Henry, Virginia

PUMICE AGGREGATE—BLOCK and MONOLITHIC

Bulk Mortar and Plaster Sand

The Northwest's most modern and complete pumice processing plant. Closer gradation. Any size or sizes. Accurate adjustment of fines. White pumice free from impurities. Lower costs. Guaranteed weights. Immediate delivery. Visitors welcome. Write for any information.

THE CENTRAL OREGON PUMICE CO.
821 Wall St. Bend, Oregon
Plant Phone 1646J Office Phone 166

FOR SALE OR TRADE

	Price
1-C.M.C. Jet-Crete Gun, Model 200	\$2,000.00
1-Masselup Wagon with I.D. & Tractor	3,500.00
1-Climax Blue Strak Engine 30 H.P.-Robch	500.00
1-Scan-Rite Feed Pump—large size	200.00
2-6" Centrifugal Pumps (self-priming) ex.	200.00
1-12" Centrifugal Pump (self-priming)	100.00
1-1 1/2" Centrifugal Pump (self-priming, electric power)	75.00
1-27 Pressure Pump 20 H.P. Gas Engine	250.00
1-300 H.P. 4 Ph. Electric Motor	125.00
1-4000 Lb. Drop Hammer and Cais.	500.00

GETMAN BROTHERS
South Haven, Michigan

FOR SALE

Small Concrete Block plant, good location, on railroad and main hi-way. City, Seat Town.

ELMER H. BEARD
E07 N. 6th St. Indianapolis, Iowa

MAKE US AN OFFER—SWAP OR CASH
2 Clark Model A 6000 lb. platform lift trucks, one in running condition, the other for parts. Large size Colorcrete machine. Revolving Dumbrik Pallet Oiler. Wanted: 9-12 cu. ft. mixer.

CONCRETE PRODUCTS
Elkhart, Ind.

PRODUCERS OF

Crushed and Powdered Marble, excellent for Marble Faced Blocks.

UNIVERSAL MARBLE PRODUCTS CORP.
Thornwood, Westchester County, N. Y.

WANTED

One or two 2 or 3 yard concrete truck mixers.

SCANDROLI CONSTRUCTION CO.
823 N. Madison St. Rockford, Ill.

WANTED

Jetting Pump, 150 G.P.M. against 175 Lb. Pressure.
Air Compressor
Dump Truck—heavy duty
3-Phase Concrete Mixer
Small, Portable Batch Plant

GETMAN BROTHERS
South Haven, Michigan

WANTED TO PURCHASE

2 Cu. yard Stationary Mixer complete with motor and controls. In good condition. Reply to Box 169, Concrete Products, 309 W. Jackson Blvd., Chicago 6, Illinois.

FOR SALE

BLOCK MACHINE—practically New

Kelley Power Stripper
12" 8" 4" Mold Boxes
12" 8" Steel Pallets
Reciprocating Feeder

Will Sacrifice Far Below Cost

FROST SAND & GRAVEL CORP.
New Rochelle, N. Y.

FOR SALE

Surplus Equipment for Quinn Pipe Machine

2-54"x5 1/2"x18" Machine forms
16-54" Bottom Rings
1-54" Header
1-54" Master Pallet
2-60"x9"x18" Machine Forms
15-60" Bottom Rings
1-60" Header
1-60" Master Pallet
1-Steel Wheel Pipe Cart—Quinn

CONCRETE PIPE PRODUCTS CO., INC.
Box 183 Lake Charles, La.

Stearns Chipper Stripper—1947 Model. Production 8 hrs. 2400 units. Perfect condition with 8" and 12" attachments also new parts. F.O.B. \$1800.00.

MAISEL BROS., INC.
Glenburnie, Md. Phone Glen. 550

FOR SALE

400 steel pallets made for lift-truck machine, size 18x22, 5/16 thick F.O.B. Holland, Michigan. Brand new. Make offer.

MONTICELLO LUMBER CO., INC.
Monticello, New York

FOR SALE

International Harvester Power Unit Model PAT100 with extra Delco-Remy Starter and extra Radiator Core. Recently overhauled, ready to run. Price \$650 loaded on your truck at our plant.

CONCRETE SILO COMPANY
Bloomfield, Indiana

NATIONALLY KNOWN MANUFACTURER WANTS SALES REPRESENTATION

We need an experienced sales representative in the Chicago, St. Louis, Birmingham and Newark, N.J. areas. Only men experienced in block machines and contractors equipment will be considered. Liberal commission. Feel free in answering this advertisement since you are not now and never have been employed by us. State age, experience and by whom previously employed in first letter. Box 168, Concrete Products, 309 W. Jackson Blvd., Chicago 6, Illinois.

SALESMEN WANTED—To sell America's newest and lowest priced pre-cast step forms to block and concrete products plants as a sideline. Commission basis. One adjustable set gives unlimited daily production in most needed sizes. Sold outright—no franchise to buy. RITE STEP CO., 2040 Pecos, Beaumont, Texas.

Missing something?



Yes... the horse. A cowboy needs his horse—and 99% of all masonry building needs Blok-Mesh.

Architects
Engineers
Contractors
Home Owners

are specifying and using
Blok-Mesh reinforcing
for more durable
masonry walls

CARTER-
WATERS

BLOK-MESH

**BLOCK
PLANT
OPERATORS...**
ARE YOU MISSING SALES?

Not if you're a Blok-Mesh dealer, because building blocks and Blok-Mesh just naturally go together for greater sales volume.

The advantages of Blok Mesh are important in all types of masonry including concrete block, lightweight block, clay tile and brick; and as a device to tie face brick to back up block, and for cavity wall construction. Due to its low cost, its ease of handling, and greater strength imparted to a wall, architects like to specify its use when plans are drawn... and homeowners appreciate the insurance it affords against unsightly cracks that occur frequently in ordinary masonry walls. In many cases this means a pre-sold item to a prospective list you already have established—your building block customers. It's a natural for the block plant operator who is also a Blok Mesh dealer.

BLOK-MESH...

... designed to eliminate "stair-step" cracking above lintels and beneath sills—greater lateral strength is gained at small cost.

... comes in 10' lengths and is packaged in bundles of 50 pieces (500 lineal ft.)

... is available in either plain or galvanized wire.

... is manufactured of high tensile wire rods—electrically welded every 16 inches.

... is made up for wall thicknesses of 4", 6", 8", 10", 12", and 13". Walls of greater thicknesses may be accommodated by using a combination of these sizes.

... is available in three types—standard, flat, or extra heavy.

Write
for detailed
descriptive Blok-
Mesh folder and Dealer
price list

address
Dept. B-D 2440 Pennway,
Kansas City 8, Missouri

CONSTRUCTION THE MATERIALS

CARTER-WATERS

KANSAS CITY CORP. 8 MISSOURI

**BLOK-MESH BOLSTERS OVERALL SALES... A BOOST
TOWARD BETTER BUSINESS FOR BLOCK PLANT
OPERATORS.**

**INDEX TO ADVERTISERS
IN THE CONCRETE PRODUCTS SECTION
OF ROCK PRODUCTS**
ALSO SEE INDEX OF ROCK PRODUCTS SECTION
ADVERTISERS ON PAGES 206, 207

Baughman Mfg. Co., Inc.	180
Beard, Elmer H.	189
Berg Vault Co.	188
Besser Mfg. Co.	186
Blaw Knox Co.	166
Blue Ridge Tale Co., Inc.	189

Cameron Joyce & Schneider	189
Carter-Waters Corp.	190
Central Oregon Pumice Co.	189
Chain Belt Co.	179
Cleveland Vibrator Co.	178
Clipper Mfg. Co.	191
Columbia Machine Works	187
Concrete Equipment Co.	186, 188
Concrete Pipe Products Co., Inc.	189
Concrete Silo Company	189
Concrete Transport Mixer Co., Inc.	186
Cone-Crete Products	189

Duluth Cinder Slag and Stone Co.	189
----------------------------------	-----

Erickson Power Lift Trucks, Inc.	186
----------------------------------	-----

Frost Sand and Gravel Corp.	189
-----------------------------	-----

Gatzke, Charles, Mfg. Co.	188
General Engines Co., Inc.	189
Gerlinger Carrier Co.	187
Getman Bros.	189

Jackson and Church Co.	192
Jaeger Machine Co.	181
Johnston Mfg. Co.	188

Kent Machine Co.	185
------------------	-----

Landers Segal Color Co.	189
Lith-I-Bar Co.	187
Lone Star Cement Corp.	168

Maisel Bros., Inc.	189
McMindes, Roy P., Co.	189
McNamee Ready Mix Concrete Co.	189
Monticello Lumber Co., Inc.	189
Multiplex Machinery Corp.	183

Olsen, Gene, Corp.	188
--------------------	-----

Pennsylvania-Dixie Cement Corp.	185
---------------------------------	-----

Rite Step Co.	189
---------------	-----

Scandrol Construction Co.	189
Standard Block and Supply	189

Unit Crane and Shovel Corp.	182
Universal Marble Products Corp.	189
Universal Vibrating Screen Co.	182

Van Ornum Co.	184
---------------	-----

Williams, C. K., and Co.	176
Worthington Pump and Machinery Corp.	177



Clipper

LEADS AGAIN WITH A NEW
INVENTION THAT CUTS BLADE COSTS

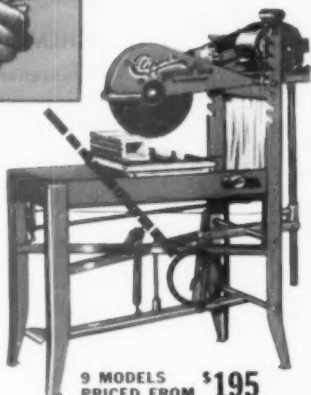
DIAL-A-CUT and SAVE-A-BLADE

SAVE-A-BLADE DIAL *Properly Cushions*
BLADE PRESSURE for LONGEST BLADE LIFE

FREE TRIAL

Don't wonder about the greater profits you'll make with the NEW Clipper SAVE-A-BLADE Dial. A FREE TRIAL will convince you! Only thru Clipper's outstanding policy of FREE TRIAL are you guaranteed ACTUAL TESTING ON THE JOB FULL SATISFACTION... AT NO OBLIGATION!

...by the
Originators of
Masonry Saws



9 MODELS
PRICED FROM \$195

Just turn the "SAVE-A-BLADE" Dial to the hardness of the material you're cutting, and the Clipper Pressure Equalizer Spring automatically sets to the tension that guarantees faster cutting and longest blade life—Whether the material is HARD or SOFT... Whether using Diamond or Abrasive Blades... Cutting Wet or Dry with the "DUSTLESS" Model HD.

Another addition to those already famous Clipper features "SELECT-A-NOTCH" — "ADJUST-A-CUT" — "WET-OR-DRY" Pump — and — "ONE-SPOT" Operation.

GUARDS YOUR VALUABLE DIAMOND BLADES

The "DIAMOND" setting on your SAVE-A-BLADE Dial automatically cushions the blade against shock by relieving rim of excess pressure or binding.

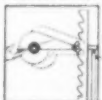


ONLY *Clipper* GIVES YOU ALL THESE EXCLUSIVE FEATURES!

- ✓ Automatic Blade Pressure
- ✓ Select-A-Notch
- ✓ Adjust-A-Cut Control
- ✓ "Wet or Dry" Pump
- ✓ One-Spot Operation



● Makes your blades last longer... Because Equalizer Spring automatically cushions blade pressure whether cutting HARD or SOFT materials. Outstanding for blade economy.



● One man easily adjusts Cutting Head to desired height... Whether cutting 12" or 1" material. Operator's handy metric guide. All weight is supported by rear Connecting Bar.



● Merely pull the knob — and the Cutting Head is free for finger tip setting at any desired angle. Release the Knob — and Head is locked in the desired position.



● No need to remove belt when cutting dry. No maintenance. Factory Sealed. An exclusive Clipper development. Patented Water Application Unit controls water flow.



● From ONE SPOT at the front of his Clipper Saw the Operator performs every cutting operation and makes every saw adjustment. Never leaves his operating position.

Serving the World as the World's Largest Manufacturer of Masonry Saws

DIRECT FROM FACTORY
TO USER

Clipper MADE RIGHT THERE

MANUFACTURING CO.
KANSAS CITY 8, MISSOURI

Cable Address: CLIPPER K. C. Mo.

PHILADELPHIA • ST. LOUIS • CLEVELAND • AUSTIN, TEX.
SAN FRANCISCO • CHICAGO • NEW YORK • PITTSBURGH



CUT WET or CUT DRY
There's a Clipper Blade
for Every Job!

MAIL THE COUPON NOW!

CLIPPER MANUFACTURING COMPANY 80
2807 N. WARWICK • KANSAS CITY 8, MO.

Send TODAY information on the FREE TRIAL offer and complete literature and prices on the 1950 Clipper Masonry Saws.

NAME _____

COMPANY _____

STREET _____

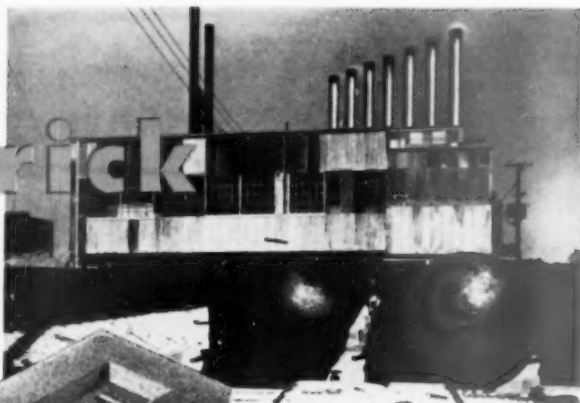
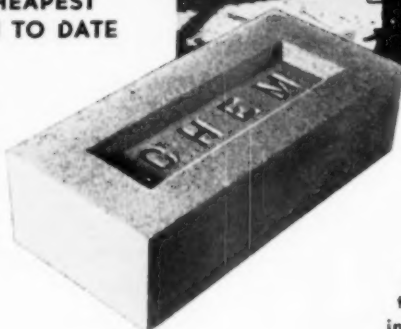
CITY _____ ZONE _____

STATE _____

AT LAST! chem brick

**A FACE BRICK
OF HIGHEST QUALITY—
MADE WITH THE CHEAPEST
MATERIALS KNOWN TO DATE**

"CHEM BRICK" re-
quires no cement or
commercial lime . . .
is made only with
sand and waste mate-
rials.



Detroit Brick & Block Company, first licensee by
Jackson & Church Company to manufacture
"CHEM BRICK"

"CHEM BRICK" . . .

the sensational, new building material . . . passes the A.S.T.M. specifications for first quality face brick and the most exacting freezing and thawing tests . . . yet no ingredient costs more than \$2 per ton, including binder.

A REAL HIGH QUALITY FACE BRICK WHICH CAN BE MADE CHEAPER THAN ANY COMMON BRICK ON THE MARKET TODAY

This quality product . . . made by the cheapest process in the brick industry is finding a ready market in the Detroit area where it has brought usually expensive brick veneering within the reach of average purses. In addition to its low cost other features are its distinctive finish, color and uniformity which give any building that "quality appearance" when used as a facing material.

Besides being a fine face brick . . . "CHEM BRICK" is an all-purpose brick because of its low cost of manufacturing. Can be used anywhere brick is used . . . facing, back-ups, partitions, manholes, fire places, chimneys, basement walls, etc.

Boxed at left are excerpts from test reports on "CHEM BRICK" made by Pittsburgh Testing Laboratory. Note distinctive appearance of home pictured utilizing "CHEM BRICK" as facing material.

PITTSBURGH TESTING LABORATORY
PITTSBURGH, PA.
April 27, 1949

REPORT
TESTS OF "CHEM" BRICK
MANUFACTURED BY
DETROIT BRICK & BLOCK CO.

COMPRESSION
(4) Tests (Standard Test Method)
50.00 LBS. 100.00 LBS. 150.00 LBS.
Average 100.00

TENSILE OF RIFTING
50.00 LBS. 100.00 LBS. 150.00 LBS.
Average 100.00

ABSORPTION
(2) Tests (Immersion - 24 Hours)
50.00 LBS. 100.00 LBS. 150.00 LBS.
Average 100.00

All samples submitted by Detroit Brick & Block Co.
PITTSBURGH TESTING LABORATORY
Barbara Detroit District

April 27, 1949

REPORT - FREEZING & THAWING

METHOD OF TEST - A.S.T.M. Designation: C-66
covering Standard Methods of
Testing & Thawing Brick for
a total of 75 cycles.

CONCLUSIONS - Test indicated compliance with specific
loading requirements for freezing and thawing test.

Respectfully submitted,
PITTSBURGH TESTING LABORATORY
Frank G. Galt
Vice President
Concrete & Masonry Division

**JACKSON & CHURCH COMPANY
SAGINAW, MICHIGAN**

"WORK WELL DONE SINCE '81"



Typical new home construction using "CHEM BRICK" as face brick.
Detroit, Michigan.

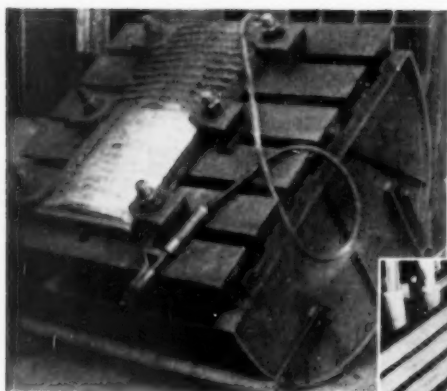
The Sign That Means **OUTPUT**



There's good reason why Bucyrus-Erie shovels are preferred in mines and quarries throughout the world, and that reason is — output. For no other excavator quite matches the speed, precision and smoothness of Bucyrus-Erie Ward-Leonard electric control, or the simple, well-balanced *years ahead* design that means faster cycles and greater production every shift. No other excavator quite equals Bucyrus-Eries in ability to stay on the job for dependable service year after year. And no other excavator is built with more careful selection of quality materials, finer craftsmanship or longer practical field experience representing nearly 70 years of continuous leadership in the design and manufacture of excavating machines.

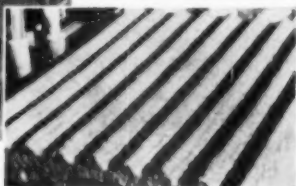
BILLAR

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN



Above: One type of jig used to hold plate securely. Cost to build about \$500.

Right: Finished rebuilt plate. Note perfect re-ribbing.



Rebuilding with

TWO-TONE ALLOYS

MANGA-TONE N.M. is used with a mild steel electrode in rebuilding jaw crusher plates. The crusher plate is clamped rigidly to a jig as shown at left, which is so constructed that warping is reduced to the allowable minimum. Pressures can be varied during the rebuilding procedure to prevent warping from welding heat.

Gyratory Crusher Liners and Mantles are easily rebuilt by this process of using MANGA-TONE N.M. and a mild steel electrode.

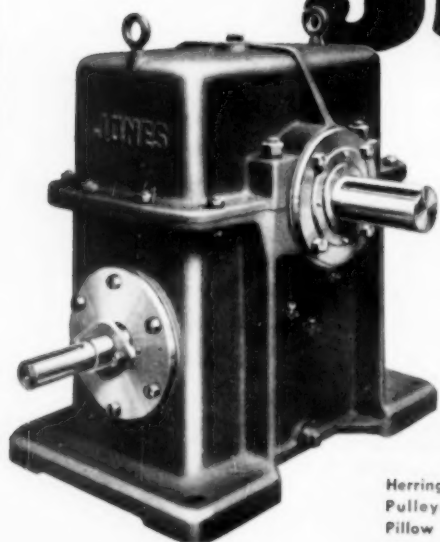
After rebuilding with MANGA-TONE N.M., RESISTO-LOY beads are laid on the rebuilt plate ribs, on the liners and mantles with the result that a rebuilt part will outlast and outperform new parts better than 3 to 1. Rebuilt manganese steel parts will crush more and harder rock with less effort and with reduced quantity of unwanted "fines" than new plates or mantles.

RESISTO-LOY will not chip, spall or flake off under severe impact. MANGA-TONE N.M. enables you to do a better rebuilding job in a third of the time it takes to do it the old single electrode way.

Resisto-Loy Company

Grand Rapids 7, Michigan

Jones



WORM GEAR SPEED REDUCERS

A right angle unit built for heavy duty performance in any industry. The worm can be above or below the gear. Shafts are single or double extended for coupling connections or chain or gear drives.

They are built in ratios from 4 to 1 to 90 to 1 and in capacities from 1/4 to 100 H.P.

Bulletin No. 68 covers selection tables and dimensions.

W. A. JONES FOUNDRY & MACHINE CO.
4447 W. Roosevelt Rd., Chicago 24, Ill.

Jones
Since 1890
In the Service of Industry

Herringbone — Worm — Spur — Gear Speed Reducers
Pulleys — Gears — V-Belt Sheaves — Anti-Friction
Pillow Blocks — Friction Clutches — Flexible Couplings

You Can Cut Today's High Production Costs with

STURTEVANT EQUIPMENT



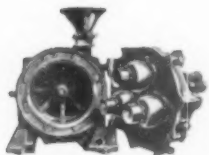
AIR SEPARATOR

For separation of fines to 325 mesh and finer. Increases output from 25% to 300% . . . lowers power costs by 50%. For years, this separator has been the standard in the cement industry.



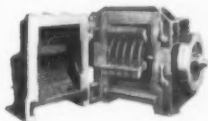
DUSTLESS BLENDER

Four-way mixing action assures a thoroughly blended product. Open-door accessibility permits easy cleaning. Available in many mixing capacities for 1/4 ton per hour and up.



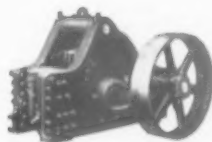
RING-ROLL MILLS

For medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open-door accessibility. Many sizes. No scrapers, plows, pushers, or shields.



SWING-SLEDGE MILLS

For coarse and medium reduction (1" to 20 mesh). Open-door accessibility. Soft, moderately hard, tough or fibrous substances. Built in several types and many sizes.



JAW CRUSHERS

For coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.

Sturtevant equipment, such as illustrated, helps you overcome high labor and production costs by increasing output. In addition, their rugged construction assures long life with minimum maintenance. It will pay you to investigate these machines. Write for information.

STURTEVANT MILL COMPANY

102-A CLAYTON STREET, BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

MAIL COUPON TODAY!

STURTEVANT MILL COMPANY
102-A Clayton Street, Boston 22, Mass.

Gentlemen:
Please send me your catalog. I am especially interested in _____

Name _____

Street _____

City & State _____



LINK-BELT "100" BELT CONVEYOR IDLER

Offers Outstanding Service Features

- **CLEAN OPERATION**—Seal keeps grease in, dirt out
- **LESS BELT WEAR**—Rolls smooth to minimize belt wear
- **STRONG CONSTRUCTION**—Roller Bearings of high-grade steel. Nuts and Yokes interlocked to prevent brackets from spreading. End Brackets riveted to provide stability, transmit load directly to steel bar feet
- **EASY LUBRICATION**—Grease Fittings provide easy and safe lubrication, protected within end bracket



Complete Link-Belt Line Includes
Return Idlers—Rubber Tread Return Idlers—Rubber
Tread Impact Troughing Idlers—Positive Action Self-
Aligning Idlers

SEND FOR BOOK NO. 1915

LINK-BELT COMPANY

Chicago 9, Indianapolis 5, Philadelphia 40, Atlanta, Houston 1,
Minneapolis 3, San Francisco 24, Los Angeles 33,
Seattle 4, Toronto 8
Offices, Factory Branch Stores and Distributors in Principal Cities

HOW TO REEVE THE BUCKET FOR MAXIMUM EFFICIENCY



CORRECT reeving of your bucket is essential for maximum digging efficiency and proper speed of operation. Complete instructions for proper reeving to fit every job are included in Bulletin 2230-R. You will also get a wealth of

information about lubrication, lengthening cable life, repairing worn parts and operating information that mean increased efficiency. Just ask for Bulletin 2230-R.



BLAW-KNOX DIVISION of Blaw-Knox Company

2035 Farmers Bank Bldg. • Pittsburgh 22, Pa.

BLAW-KNOX CLAM-SHELL BUCKETS

THE MOST COMPLETE RANGE OF SIZES AND TYPES

If Your Operation Calls for Rails



Wisdom calls for DAVENPORTS

**Better-Built
DAVENPORTS
are AVAILABLE
in STEAM
GASOLINE
DIESEL
with
ELECTRIC
or
MECHANICAL
DRIVE**

Write Us Today



A Davenport Better-Built Locomotive will give you flexible, always available haulage power for record work accomplishment at lowest ton-mile costs. Whatever the size and type you require, a Davenport will put Profit-Power on your rails.

WE ANALYZE YOUR NEEDS

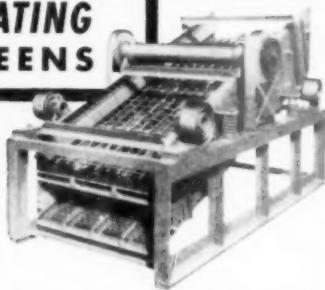
It will be a pleasure to send you our latest Haulage Survey Data Sheet to enable you to describe your haulage conditions accurately and completely. Our engineers will analyze the data you submit and recommend the power unit that will perform most profitably for you.

**EXPORT OFFICE
BROWN & SITES CO., INC.**
50 Church St. New York 7

Cable Address "BROSITES"

DAVENPORT LOCOMOTIVE WORKS
A DIVISION OF DAVENPORT BESLER CORP.
DAVENPORT, IOWA, U. S. A.

OVERSTROM VIBRATING SCREENS



FOR LIGHT, MEDIUM and HEAVY DUTY SCREENING WET or DRY

The Double Deck Heavy Duty 4' x 10' OVERSTROM Vibrating Screen illustrated is one of many types and sizes available for screening of crushed rock products, sand and gravel, limestone, cement, gypsum, barite, mining ores, salt, coal, coke, etc.

Screening machinery, engineered by pioneers and accepted by industry throughout the world for the past 25 years, is available for various applications, in any type or size; single, double or triple-deck models; open type or dust-housed complete with hoppers and chutes fabricated to specifications.

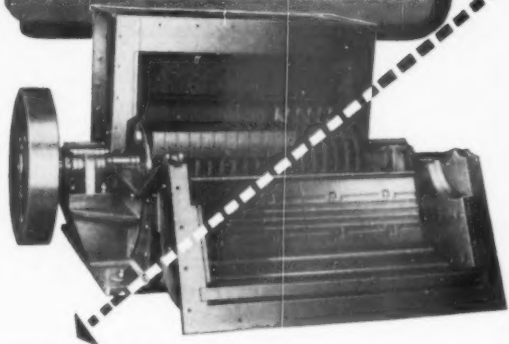
Write to Screening Machinery Division for Bulletin S-4.

OVERSTROM & SONS ENGINEERS AND MANUFACTURERS

Screening Machinery • Concentrating Tables

2213 West Mission Road • Alhambra, California, U. S. A.

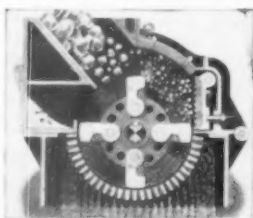
For Cost Reduction on Material Reduction...



WILLIAMS' "HEAVY-DUTY" HAMMERMILLS

Built to take 6" feed and reduce to agricultural limestone, $\frac{3}{4}$ " stone and other small sizes in *one operation!* Crushing occurs on unusually heavy breaker and grinding plate before reaching grate. This permits grates to be used for sizing only, minimizing wear. The result; more output, more quickly reduced at less operating cost.

Sectional view of Williams "Heavy-Duty" hammermill, with heavy liners and grinding plate for limestone and other hard material. Particular attention is directed to the grinding plate adjustment which assures uniform close contact of hammers and grinding plate at all times. Also note the metal trap which provides an outlet for the escape of tramp iron.



WILLIAMS ALSO MAKES...

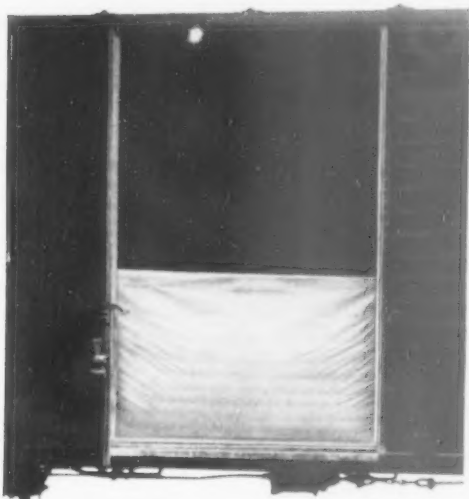
Heavy-duty hammermills in smaller sizes for all quarry operations; impact and roller mills for 200 to 325 mesh grinding; drier mills; air separators; vibrating screens; steel bins; complete "packaged" crushing and grinding plants.

WILLIAMS PATENT CRUSHER AND PULVERIZER CO.
800 ST. LOUIS AVE. ST. LOUIS 6, MO.

WC 46-4



BETTER DOORWAY BARRICADES FOR BULK SHIPMENTS



SIGNODE RETAINING DOORS

So much protection at so low a cost! No wonder shippers of such bulk materials as commercial fertilizers, silica sand, clay and other minerals rely on Signode One-Piece Retaining Doors.

Made of strong Signode steel strapping, scientifically spaced between layers of heavy duty, water repellent kraft liner board, Signode Retaining Doors are supplied in 3 ft., 4 ft., and 6 ft. heights.

F E A T U R E S

- 1 **One-piece door**—no waste materials—no doorway liners.
- 2 **Lightweight**—6 ft. height weighs only 14 lbs. Easy to handle.
- 3 **Easily applied**—one man can apply, using only hammer and nails.
- 4 **Low cost**—savings in material and installation costs as well as dunnage.
- 5 **Positive protection**—load pressure seals sides and bottom flap; prevents loss of commodities.
- 6 **Nailing**—use of double-head nails permits quick removal of doors with minimum damage to car door posts.
- 7 **Saves storage space**—twenty-five 6 ft. doors, for example, are packed in crate 7½ ft. x 2½ ft. x 5 in. This is more than enough to cooper 12 freight cars!

For further information promptly—write:

SIGNODE STEEL STRAPPING COMPANY

2662 North Western Avenue • Chicago 47, Illinois

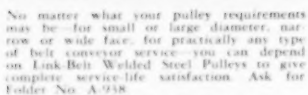
THIS SEAL MEANS

SIGNODE

SECURITY IN SHIPPING



FEATHERED



Chicago 3, Indianapolis 6, Philadelphia 30,
Albany 1, Dublin 1, Minneapolis 2, San Francisco 24,
Los Angeles 11, Seattle 4, Toronto 8,
Commercial Office, Factory Show-rooms and
Institutions in Principal Cities.

of Link-Belt

welded steel pulleys

- Fully welded; water-tight and dust-tight.
- Removable hubs except for 6" and 8" diameters.
- Hubs are flush with face of pulley.
- Hubs keyseated in line, with two set screws.
- Interchangeable hubs; many stock-size hubs available.
- Chamfered hubs for easy shaft entry.
- Minimum weight and non-breakable.
- May be rubber-lagged to increase belt friction.

DO THE TOUGHEST JOBS AT LOWEST COST...

Lightning Heavy-Duty 6, 8 and 10-in. pumps cost less to buy, to operate and maintain. They pass large solids at heads up to 130-ft., take the bumps and friction with almost no wear. Oversize shaft and bearings, quickly replaceable parts. Write today for information.

FREE BOOK

Model XH

KANSAS CITY HAY PRESS CO.
801 Woodswether Road Kansas City 6, Missouri

ACCURATE • DURABLE • ECONOMICAL

The reliability of T.C. Alloy Screens has carried them into all parts of the world. Made in Standard and Special Weaves, with Square or Oblong Openings — from 10 mesh, .035" wire on up. Write today for Catalog No. 42.

TWIN CITY IRON & WIRE CO.
35 W. WATER STREET • ST. PAUL 1, MINNESOTA

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

Also manufactures QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS 1603 12TH ST. BOONE, IA

Manufactured exactly to your specifications

Any size or style screen, in thickness of steel wanted with any size perforation desired.

We can promptly duplicate your present screens at lowest prices

CHICAGO PERFORATING CO.

2437 West 24th Place
CHICAGO 8, ILLINOIS
Virginia 7-6757

HAYWARD

**WON'T QUIT
OR CAUSE TIME OUT**

A Hayward Bucket keeps the job
going ahead on scheduled time. It
won't quit or cause time out.

THE HAYWARD COMPANY
202-204 Fulton Street
New York, N. Y.

BUCKETS

**WON'T QUIT
CAUSE TIME OUT**

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD COMPANY
202-204 Fulton Street
New York, N. Y.

Slurries...handled at Lower Cost

S... handled at
Continuous operation without attention.
Individual engineering on every appli-
cation. Heavy pumping parts of rubber,
elloy iron, alloy steel - engineered to
your specific requirements. Buy
WILFLEY for economy and efficiency.



WILFLEY

centrifugal PUMPS

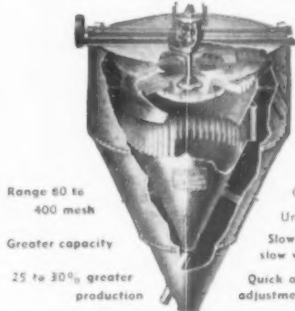
A. R. WILFLEY & SONS., Inc.
Denver, Colo., U.S.A., New York Office:
1775 Broadway, New York City

GAYCO CENTRIFUGAL SEPARATORS

GAYCO Separators, equipped with the adjustable centrifugal sizing fan — an exclusive GAYCO feature — make closer separations. Closer separations bring about higher production through efficient removal of the fines made by the mill. Closer separations bring about higher quality products by eliminating all undesirable oversize.

"TIMKEN BEARING EQUIPPED"

GAYCO brings you all these:



Range 60 to
400 mesh
Greater capacity
25 to 30% greater
production

Cleaner Tailings
Uniform Products
Slow speed for
slow wear
Quick and easy
adjustments

If you have an exceptionally hard separating problem, TRY THE GAYCO.

UNIVERSAL ROAD MACHINERY CO.

Rubert M. Gay-Division

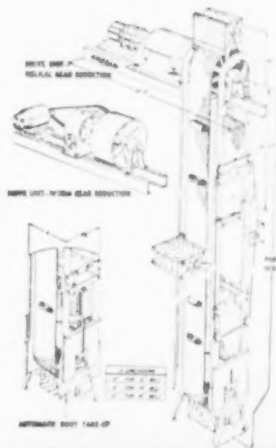
Factory and Laboratory, Kingston, N. Y.

117 LIBERTY STREET NEW YORK 6, N. Y.

Canadian Representative: F. H. Hopkins & Co., Ltd.
8500 Decarie Blvd., Montreal, Que.

EHRSAM EMPLOYEES ELEVATOR

**makes you
MONEY**



Steps saved ... money saved. And when you count the steps saved, through use of an Ehsam elevator, it means a neat profit for you.

Ehsam Employees Service Elevator is made for 3 widths of belt, 12", 14" and 16" with three types of drive units of either 3, 5 or 7 1/2 horsepower. Special applications for bags and boxes. Installation costs are reasonable. Write today for complete information.

THE J. B. **EHRSAM** & SONS
Manufacturing Co.

ENTERPRISE,

Established 1872

KANSAS U.S.A.

CLASSIFIED ADVERTISEMENTS

FOR SALE

DRIFTERS FOR SALE

2 Joy Drifters complete with columns, arms, saddles, hand feed and water line. Ready to operate.

One is brand new, never been used. The other is practically new—very little use.

— A REAL SAVING —

CALL WIRE WRITE

STRAITS ENGINEERING CO.

Sault Ste. Marie, Mich., Phone 3472-73

RUBBER CONVEYOR BELTING At Lower Prices

Top Quality—Immediate Delivery
12" widths to 36" (All plies)
TRANSMISSION BELTING
AIR HOSE (All sizes)
SUCTION and DISCHARGE HOSE
WATER HOSE
V BELTS

Also Mill Remnants

Write or wire collect for prices and samples

E. D. HEEDS & SON

1286 Hollywood Ave., Memphis, Tenn.

FOR SALE

Six (6) 83" x 45 1/2" Efficient
Multitube Indirect Rotary
Coolers by Traylor for Lime
and Alumina Oxide.

THOMAS M. BROWN

1315 Oliver Bldg.—Pittsburgh, Pa.

FOR SALE

8 x 8 ft. 800 gauge steel heavy duty
Fulton Plymouth spitters
1-30 ton 800 gauge Plymouth locomotive
powered by Lister gasoline engine

THE OHIO HYDRATE & SUPPLY CO.
Woodville Ohio

NORTHWEST 78-D

2 cu. yd. diesel crawler shovel re-
built and guaranteed.

FOR SALE

HODGE & HAMMOND, INC.

1162 Grinnell Place N. Y. 59, N. Y.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C.,
for sale at Attractive Prices. Large
stock. New and Rebuilt. All fully guar-
anteed. Send us your inquiries.

V. M. NUSSBAUM & CO.
FORT WAYNE, IND.

CONSULT US BEFORE BUYING OR SELLING USED FARREL-BACON CRUSHERS SIZES 60"x48" to 10"x7"

As manufacturers of these machines we are in a position to as-
sure you as to condition and operating ability. Send for catalog.

149 Broadway **BACON-PIETSCH CO., INC.** New York 6, N. Y.

FOR SALE

CARLYLE
INDUSTRIAL RUBBER PRODUCTS
FOR EVERY PURPOSE

WHY WAIT We have 8 to 48 RUBBER CONVEYOR BELTING

TOUGH COVERS—Heavy duty, specially compounded, abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.

STRONG CARCASS—Constructed of finest quality 12 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.

FLEXIBILITY—Careful attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features; troughs easily, runs true on all idlers, gauge resistant, excellent for long and short hauls and slope installations.



Avoid delays in
your production schedules!

We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches.

Width	Ply	Thickness		Type of Duck
		Top Cover	Bottom Cover	
8"	4	1 1/8"	1 3/8"	28 Oz.
10"	4	1 1/8"	1 3/8"	28 Oz.
12"	4	1 1/8"	1 3/8"	28 Oz.
14"	4	1 1/8"	1 3/8"	28 Oz.
16"	4	1 1/8"	1 3/8"	28 Oz.
18"	4	1 1/8"	1 3/8"	28 Oz.
20"	4	1 1/8"	1 3/8"	28 Oz.
22"	4	1 1/8"	1 3/8"	28 Oz.
24"	4	1 1/8"	1 3/8"	28 Oz.
26"	4	1 1/8"	1 3/8"	28 Oz.
28"	4	1 1/8"	1 3/8"	28 Oz.
30"	4	1 1/8"	1 3/8"	28 Oz.
32"	4	1 1/8"	1 3/8"	28 Oz.
34"	4	1 1/8"	1 3/8"	28 Oz.
36"	4	1 1/8"	1 3/8"	28 Oz.
38"	4	1 1/8"	1 3/8"	28 Oz.
40"	4	1 1/8"	1 3/8"	28 Oz.

INQUIRE FOR SIZES NOT LISTED.
ELEVATOR TRANSMISSION & V-BELT.
ING ALSO IN STOCK

All our belting made by the leading belting manufacturers.

Write for free Booklet on Installation, Care & Maintenance of Conveyor Belting.

SEND US YOUR INQUIRIES FOR OTHER RUBBER PRODUCTS.

CARLYLE RUBBER CO., Inc.
62 66 Park Place, New York 7, N. Y.
Phone: DIgby 9-3810

FOR SALE

40 ton Orion diesel locomotive crane
30 ton Daventry diesel locomotive
16 ton Plymouth 285 2nd. locomotive
1 1/2 yd. Lima 681 diesel shovel-drag line
20 yd. Koppel air dump cars, Std. 48
SRI-CM Cide Phen air compressors
150 HP Kewanee portable boilers
3/4 yd. Northwest 25 gas crane-drag line
2 yd. P&H 855 dragline, New 1948
Mississippi Valley Equipment Co.
513 Locust St. St. Louis 1, Mo.

BELT CONVEYOR: 2950 ft. all steel, 36" with roller bearing troughing and return idlers, 5 ply cord belt, 42 oz. duck, 3/4" top, 1 1/8" bottom, new 1947, slightly used.

HAMMER MILL: Jeffrey 24x36, type B-3, roller bearings, V-belt drive, NEW condition.

AIR SEPARATOR: Gayco 14 ft. with 30 H.P., 220-440 volt motor and V-belt drive, new 1947, used only two days.

LIMA SHOVEL: ROOM 2 yd. Dipper and stick, for model 802, condition like NEW.

GYRATORY CRUSHERS, SPECIAL: Allis Chalmers Superior McCully 30", manganese fitted Traylor 16".

GYRATORY CRUSHERS: All sizes 8"x 30" to 42"x134".

JAW CRUSHERS: Farrel 15-T, size 24x 36", manganese fitted, with or without motor and drive. Pioneer 24x36, portable, with or without diesel power. Also, in sizes 4x6 to 48x60".

REDUCTION CRUSHERS: Symons 2 ft. 3 ft., 4 ft. and 5 ft. T-10 length 24" gyrasphere. Good Roads 1049, Allis Chalmers R322.

LOCOMOTIVE: Plymouth 25 ton, standard gauge with caterpillar diesel motor.

SCREENS: 5 ft. x 14 ft., double deck, 15 H.P. motor.

SHOVELS: Bucyrus-Erie model 170 E, 6 cu. capacity, 2200 volt, A.C., built 1947.

TRUCKS: 30. Each built dump, also end dump, with rock bodies, Cummins 150 H.P. and 275 H.P. diesel motors, with booster steering.

GOODRICH SUPER LONG LIFE CORD CONVEYOR BELT (NEW): Large quantity of Goodrich 3/32" top cover, 1 1/8" bottom cover, on original reels, all NEW NATURAL RUBBER, with or without mechanical parts.

A. J. O'NEILL

Lansdowne, Pa.

Phila. Ph.: Madison 3-8300-3-8301

FOR SALE

1-1 B & W coal pulverizer
1-American pulverizer with 125 H.P. motor
1-Jeffrey hammer mill 24"x30"
1-Hammer mill 42"x30"
1-70 H.P. Marine type diesel engine
1-Vacuum pump
1-Deck hoist
Tug boat
Electric motors 30
Generator sets 30 KW and 50 KW
Air compressors
Link Belt pan conveyors 36"x22" centers
Richardson automatic scales
2-Fuller Kinson pump 6"
Steel tanks
1-Fuller Kinson rotary compressor
1-10x150 kiln with new liners
Fuller Linker cooling equipment for 16" kiln
8-hundred tube mill 66"x20"
5 1/2"x22" tube mill
3/4" Banding tape
4" and 5" 2 and 3-way cement control gate valves
3- Small gasoline driven generators
Chain and belt elevators

OLLIE E. LAWRENCE

P.O. Box 688 Quincy, Michigan

1-JAW CRUSHERS: 1948, 24x36 and 24x 36
1-FARREL, TRAYLOR, CEDAR RAPIDS
300 FT. C.F. ELECTRIC AIR COMPRESSOR
1-30" GAYCO MECHANICAL SEPARATOR
1-30" NEW CONVEYOR
12 yd. 2 PLY VULCAN GAS LOCOMOTIVES
30 TON AMER. GAS LOCO. CRANE
30 TON PLYMOUTH DIESEL LOCOMOTIVE
30 FT. SYMONS SHORT HEAD CONE
1-1 R. QUARRY MASTER DRILLS
1-1000' HARDINGE BALL MILL
1-100 FT. 30" and 36" CONVEYOR BELTS
30"x42" and 18"x42" ROTARY DRYERS
1-1000 AMER. 30 FT. ROOM STIFF LEG DER
1-1000 100 FT. H.P. ELEC. HOIST
1-10 VIBRATING SCREENS: 36, 38, 40, 42, 50, 60, 72
1-100' DECATUR WELLS DRILL
1-100 100 FT. STEEL GUY DERRICK
DARIEN, 80 E. 42nd St., N. Y. 17, N. Y.

CARLYLE
INDUSTRIAL RUBBER PRODUCTS
FOR EVERY PURPOSE

SUCTION HOSE

Stock No. CO-341

Heavy duty, smooth bore, wire inserted Suction Hose. Flexible and strong. For use in mines, sewers, treatment, etc. with diaphragm pumps, pressure pumps and other contractors equipment. Prices shown include I.P.T. Couplings attached to each length.

Size and Length	Price Per Foot	Size and Length	Price Per Foot
1 1/2" x 10 ft.	\$3.25	2 1/2" x 10 ft.	\$10.00
1 1/2" x 20 ft.	5.75	2 1/2" x 20 ft.	20.00
1 1/2" x 30 ft.	8.00	2 1/2" x 30 ft.	30.00
1 1/2" x 40 ft.	10.00	2 1/2" x 40 ft.	40.00
1 1/2" x 50 ft.	12.00	2 1/2" x 50 ft.	50.00
1 1/2" x 60 ft.	14.00	2 1/2" x 60 ft.	60.00
1 1/2" x 70 ft.	16.00	2 1/2" x 70 ft.	70.00
1 1/2" x 80 ft.	18.00	2 1/2" x 80 ft.	80.00
1 1/2" x 90 ft.	20.00	2 1/2" x 90 ft.	90.00

DISCHARGE HOSE

Stock No. CO-342

Cotton jacket, rubber lined hose suitable for water supply and discharge service. Constructed exactly like Fire Department hose. Light in weight. For pressures to 200 lbs. Attached to each length are Iron Pipe Thread Couplings.

Size and Length	Price Per Foot	Size and Length	Price Per Foot
1 1/2" x 10 ft.	\$6.00	2 1/2" x 10 ft.	\$18.00
1 1/2" x 20 ft.	10.00	2 1/2" x 20 ft.	30.00
1 1/2" x 30 ft.	14.00	2 1/2" x 30 ft.	42.00
1 1/2" x 40 ft.	18.00	2 1/2" x 40 ft.	54.00
1 1/2" x 50 ft.	22.00	2 1/2" x 50 ft.	66.00

HIGH PRESSURE HOSE

Stock No. CO-343

2 1/2" x 8 PLY DUCK AND CORD CONSTRUCTION SUITABLE FOR 400 LBS. WORKING PRESSURE.

For that difficult job where high pressures are encountered Carlyle offers this rugged flexible hose saving you cost 50% in cost and giving dependable service for the following jobs—

- Jetting—Water, Air, Cement
- Hydraulic Grade
- Steam to 100 lbs. Pressure
- Oil Discharge

Low Pressure at 10-15-20-25-30-36 ft. lengths. High Pressure Couplings attached as follows:

Male & Male	2 1/2" x 1 P.T.	\$10.0
Female & Male	2 1/2" x 1 P.T.	12.0
Female & Female	2 1/2" x 1 P.T.	16.0

COMPRESSOR AIR HOSE

Stock No. CO-344

250 Lbs. Working Pressure. Heavy duty extremely flexible. Pneumatic Air Hose. For all Air Tools, Compressors, Chippers, Riveters, Drills and Breakers. Each length complete with Universal Air Hose Couplings attached. These couplings are quick snap and interchangeable with Air King, Chicago, Cleveland and others.

Size and Length	Price Per Foot
1 1/2" x 10 ft.	\$7.25
1 1/2" x 20 ft.	13.00
1 1/2" x 30 ft.	18.75
1 1/2" x 40 ft.	24.50
1 1/2" x 50 ft.	30.25
1 1/2" x 60 ft.	36.00

Over-stocked. Drastically reduced prices to move.

Terms: f.o.b. N. Y. City—2%—10 days.

CARLYLE RUBBER CO., Inc.
62-66 Park Place, New York 7, N. Y.
Phone: DIgby 9-3810

FOR SALE COMPRESSORS

1- Ingersoll Rand Imperial Type X 10 Stationary 1500 CFM \$1500.00
2- Ingersoll Rand Model K-500 w Waukesha Hesselman Oil engine portable Mounted Pneumatics — late models Excellent cond. \$5500 ea.
Stiers Bros. Construction Company
2944 Magazine St. St. Louis, Mo.

CRUSHERS, ETC.

- 1—Kent Maxcon-Type No. 7 Ring Roll Mill and Drive
- 1—Startevant No. 2 Ring Roll Mill and Drive
- 1—Pair Rolls, Allis-Chalmers 40"x15", Anaconda, Completely rebuilt
- 1—No. 6 Traylor Laboratory Crusher with T.Z. head
- 1—No. 4½ Traylor Gyr. Crusher
- 1—No. 5 Champion Jaw Crusher 14"x20"
- 1—No. 4½ Champion Jaw Crusher 10"x20"
- 1—L.D. 3'x8' P.D. Heavy Duty Double Deck Screen
- 1—L.D. 4'x8' N. P. Double Deck Screen
- 1—4'x5' Tyler Hammer D. Deck Vibrating screen
- 1—18" Link-Belt Apron Conveyor 30' pitch, 27" centers

Bucket Elevators, open and totally enclosed, new and used, as is or rebuilt.

JOHNSON & HOENLER, INC.

P.O. Box 102 Lansdowne, Pa.

OUTSTANDING SHOVEL AND CRANE BARGAIN

Marion Model 471 Gas Electric Shovel 13½ cu. yd. rated capacity equipped with 2 cu. yd. shovel dipper, Waukesha 6-cylinder gasoline engine operating G.E. generator and motors. New 50' crane boom included. Where electric current is available in pit, quarry or dock, gas engine could be eliminated for low cost operation. A real buy at \$5,000

H. O. PENN MACHINERY CO., INC.

140th St. and E. River N. Y. 54, N. Y. CYPRESS 2-4800

GYRATORY 30", 36", 42" and 48" Allis-Chalmers and No. 12, 15, 18, 24, 30, 36, 42, 48 JAW TYPE 24x36, 30x40, 36x42, 42x48, 48x60 and smaller sizes to 72". REDUCTION TYPE 2, 3, 4, 5, 6, 8, 10, 12, 15, 18, 24, 30, 36, 42, 48, 60, 72, 84, 96, 108, 120, 144, 168, 192, 216, 240, 270, 300, 324, 360, 396, 432, 468, 504, 540, 576, 612, 648, 684, 720, 756, 792, 828, 864, 900, 936, 972, 1008, 1044, 1080, 1116, 1152, 1188, 1224, 1260, 1296, 1332, 1368, 1404, 1440, 1476, 1512, 1548, 1584, 1620, 1656, 1692, 1728, 1764, 1800, 1836, 1872, 1908, 1944, 1980, 2016, 2052, 2088, 2124, 2160, 2196, 2232, 2268, 2304, 2340, 2376, 2412, 2448, 2484, 2520, 2556, 2592, 2628, 2664, 2700, 2736, 2772, 2808, 2844, 2880, 2916, 2952, 2988, 3024, 3060, 3096, 3132, 3168, 3204, 3240, 3276, 3312, 3348, 3384, 3420, 3456, 3492, 3528, 3564, 3600, 3636, 3672, 3708, 3744, 3780, 3816, 3852, 3888, 3924, 3960, 3996, 4032, 4068, 4104, 4140, 4176, 4212, 4248, 4284, 4320, 4356, 4392, 4428, 4464, 4500, 4536, 4572, 4608, 4644, 4680, 4716, 4752, 4788, 4824, 4860, 4896, 4932, 4968, 5004, 5040, 5076, 5112, 5148, 5184, 5220, 5256, 5292, 5328, 5364, 5400, 5436, 5472, 5508, 5544, 5580, 5616, 5652, 5688, 5724, 5760, 5796, 5832, 5868, 5904, 5940, 5976, 6012, 6048, 6084, 6120, 6156, 6192, 6228, 6264, 6300, 6336, 6372, 6408, 6444, 6480, 6516, 6552, 6588, 6624, 6660, 6696, 6732, 6768, 6804, 6840, 6876, 6912, 6948, 6984, 7020, 7056, 7092, 7128, 7164, 7200, 7236, 7272, 7308, 7344, 7380, 7416, 7452, 7488, 7524, 7560, 7596, 7632, 7668, 7704, 7740, 7776, 7812, 7848, 7884, 7920, 7956, 7992, 8028, 8064, 8100, 8136, 8172, 8208, 8244, 8280, 8316, 8352, 8388, 8424, 8460, 8496, 8532, 8568, 8604, 8640, 8676, 8712, 8748, 8784, 8820, 8856, 8892, 8928, 8964, 9000, 9036, 9072, 9108, 9144, 9180, 9216, 9252, 9288, 9324, 9360, 9396, 9432, 9468, 9504, 9540, 9576, 9612, 9648, 9684, 9720, 9756, 9792, 9828, 9864, 9900, 9936, 9972, 10008, 10044, 10080, 10116, 10152, 10188, 10224, 10260, 10296, 10332, 10368, 10404, 10440, 10476, 10512, 10548, 10584, 10620, 10656, 10692, 10728, 10764, 10800, 10836, 10872, 10908, 10944, 10980, 11016, 11052, 11088, 11124, 11160, 11196, 11232, 11268, 11304, 11340, 11376, 11412, 11448, 11484, 11520, 11556, 11592, 11628, 11664, 11700, 11736, 11772, 11808, 11844, 11880, 11916, 11952, 11988, 12024, 12060, 12096, 12132, 12168, 12204, 12240, 12276, 12312, 12348, 12384, 12420, 12456, 12492, 12528, 12564, 12600, 12636, 12672, 12708, 12744, 12780, 12816, 12852, 12888, 12924, 12960, 12996, 13032, 13068, 13104, 13140, 13176, 13212, 13248, 13284, 13320, 13356, 13392, 13428, 13464, 13500, 13536, 13572, 13608, 13644, 13680, 13716, 13752, 13788, 13824, 13860, 13896, 13932, 13968, 14004, 14040, 14076, 14112, 14148, 14184, 14220, 14256, 14292, 14328, 14364, 14400, 14436, 14472, 14508, 14544, 14580, 14616, 14652, 14688, 14724, 14760, 14796, 14832, 14868, 14904, 14940, 14976, 15012, 15048, 15084, 15120, 15156, 15192, 15228, 15264, 15300, 15336, 15372, 15408, 15444, 15480, 15516, 15552, 15588, 15624, 15660, 15696, 15732, 15768, 15804, 15840, 15876, 15912, 15948, 15984, 16020, 16056, 16092, 16128, 16164, 16200, 16236, 16272, 16308, 16344, 16380, 16416, 16452, 16488, 16524, 16560, 16596, 16632, 16668, 16704, 16740, 16776, 16812, 16848, 16884, 16920, 16956, 16992, 17028, 17064, 17100, 17136, 17172, 17208, 17244, 17280, 17316, 17352, 17388, 17424, 17460, 17496, 17532, 17568, 17604, 17640, 17676, 17712, 17748, 17784, 17820, 17856, 17892, 17928, 17964, 18000, 18036, 18072, 18108, 18144, 18180, 18216, 18252, 18288, 18324, 18360, 18396, 18432, 18468, 18504, 18540, 18576, 18612, 18648, 18684, 18720, 18756, 18792, 18828, 18864, 18900, 18936, 18972, 19008, 19044, 19080, 19116, 19152, 19188, 19224, 19260, 19296, 19332, 19368, 19404, 19440, 19476, 19512, 19548, 19584, 19620, 19656, 19692, 19728, 19764, 19800, 19836, 19872, 19908, 19944, 19980, 20016, 20052, 20088, 20124, 20160, 20196, 20232, 20268, 20304, 20340, 20376, 20412, 20448, 20484, 20520, 20556, 20592, 20628, 20664, 20700, 20736, 20772, 20808, 20844, 20880, 20916, 20952, 20988, 21024, 21060, 21096, 21132, 21168, 21204, 21240, 21276, 21312, 21348, 21384, 21420, 21456, 21492, 21528, 21564, 21600, 21636, 21672, 21708, 21744, 21780, 21816, 21852, 21888, 21924, 21960, 21996, 22032, 22068, 22104, 22140, 22176, 22212, 22248, 22284, 22320, 22356, 22392, 22428, 22464, 22500, 22536, 22572, 22608, 22644, 22680, 22716, 22752, 22788, 22824, 22860, 22896, 22932, 22968, 23004, 23040, 23076, 23112, 23148, 23184, 23220, 23256, 23292, 23328, 23364, 23400, 23436, 23472, 23508, 23544, 23580, 23616, 23652, 23688, 23724, 23760, 23796, 23832, 23868, 23904, 23940, 23976, 24012, 24048, 24084, 24120, 24156, 24192, 24228, 24264, 24300, 24336, 24372, 24408, 24444, 24480, 24516, 24552, 24588, 24624, 24660, 24696, 24732, 24768, 24804, 24840, 24876, 24912, 24948, 24984, 25020, 25056, 25092, 25128, 25164, 25200, 25236, 25272, 25308, 25344, 25380, 25416, 25452, 25488, 25524, 25560, 25596, 25632, 25668, 25704, 25740, 25776, 25812, 25848, 25884, 25920, 25956, 25992, 26028, 26064, 26100, 26136, 26172, 26208, 26244, 26280, 26316, 26352, 26388, 26424, 26460, 26496, 26532, 26568, 26604, 26640, 26676, 26712, 26748, 26784, 26820, 26856, 26892, 26928, 26964, 27000, 27036, 27072, 27108, 27144, 27180, 27216, 27252, 27288, 27324, 27360, 27396, 27432, 27468, 27504, 27540, 27576, 27612, 27648, 27684, 27720, 27756, 27792, 27828, 27864, 27900, 27936, 27972, 28008, 28044, 28080, 28116, 28152, 28188, 28224, 28260, 28296, 28332, 28368, 28404, 28440, 28476, 28512, 28548, 28584, 28620, 28656, 28692, 28728, 28764, 28800, 28836, 28872, 28908, 28944, 28980, 29016, 29052, 29088, 29124, 29160, 29196, 29232, 29268, 29304, 29340, 29376, 29412, 29448, 29484, 29520, 29556, 29592, 29628, 29664, 29700, 29736, 29772, 29808, 29844, 29880, 29916, 29952, 29988, 30024, 30060, 30096, 30132, 30168, 30204, 30240, 30276, 30312, 30348, 30384, 30420, 30456, 30492, 30528, 30564, 30600, 30636, 30672, 30708, 30744, 30780, 30816, 30852, 30888, 30924, 30960, 30996, 31032, 31068, 31104, 31140, 31176, 31212, 31248, 31284, 31320, 31356, 31392, 31428, 31464, 31500, 31536, 31572, 31608, 31644, 31680, 31716, 31752, 31788, 31824, 31860, 31896, 31932, 31968, 32004, 32040, 32076, 32112, 32148, 32184, 32220, 32256, 32292, 32328, 32364, 32400, 32436, 32472, 32508, 32544, 32580, 32616, 32652, 32688, 32724, 32760, 32796, 32832, 32868, 32904, 32940, 32976, 33012, 33048, 33084, 33120, 33156, 33192, 33228, 33264, 33300, 33336, 33372, 33408, 33444, 33480, 33516, 33552, 33588, 33624, 33660, 33696, 33732, 33768, 33804, 33840, 33876, 33912, 33948, 33984, 34020, 34056, 34092, 34128, 34164, 34200, 34236, 34272, 34308, 34344, 34380, 34416, 34452, 34488, 34524, 34560, 34596, 34632, 34668, 34704, 34740, 34776, 34812, 34848, 34884, 34920, 34956, 34992, 35028, 35064, 35100, 35136, 35172, 35208, 35244, 35280, 35316, 35352, 35388, 35424, 35460, 35496, 35532, 35568, 35604, 35640, 35676, 35712, 35748, 35784, 35820, 35856, 35892, 35928, 35964, 36000, 36036, 36072, 36108, 36144, 36180, 36216, 36252, 36288, 36324, 36360, 36396, 36432, 36468, 36504, 36540, 36576, 36612, 36648, 36684, 36720, 36756, 36792, 36828, 36864, 36900, 36936, 36972, 37008, 37044, 37080, 37116, 37152, 37188, 37224, 37260, 37296, 37332, 37368, 37404, 37440, 37476, 37512, 37548, 37584, 37620, 37656, 37692, 37728, 37764, 37800, 37836, 37872, 37908, 37944, 37980, 38016, 38052, 38088, 38124, 38160, 38196, 38232, 38268, 38304, 38340, 38376, 38412, 38448, 38484, 38520, 38556, 38592, 38628, 38664, 38700, 38736, 38772, 38808, 38844, 38880, 38916, 38952, 38988, 39024, 39060, 39096, 39132, 39168, 39204, 39240, 39276, 39312, 39348, 39384, 39420, 39456, 39492, 39528, 39564, 39600, 39636, 39672, 39708, 39744, 39780, 39816, 39852, 39888, 39924, 39960, 40000.

ROLLS: Allis-Chalmers 72x30, 54x74, 54x70, 40x15 & 18x10; Pioneer 18x10; Universal 18x10, New Holland 24x10 & 18x10; McLaughlin 30"x10", 18"x24" & 18"x30 Single Roll, Also others.

HAMMERMILLS: Williams Nos. 2, 3, 4 & 6; Day No. 40 & No. 70; Grindler 25X & 35X; Dale 30X & 35X.

MILLS: Hardinge 3'x8", 6'x22", 6'x30", 8'x30" & 8'x40" Kennedy 4x8, 5x8, 6x11, 8x11, 10x11, 12x11, 14x11, 16x11, 18x11, 20x11, 22x11, 24x11, 26x11, 28x11, 30x11, 32x11, 34x11, 36x11, 38x11, 40x11, 42x11, 44x11, 46x11, 48x11, 50x11, 52x11, 54x11, 56x11, 58x11, 60x11, 62x11, 64x11, 66x11, 68x11, 70x11, 72x11, 74x11, 76x11, 78x11, 80x11, 82x11, 84x11, 86x11, 88x11, 90x11, 92x11, 94x11, 96x11, 98x11, 100x11, 102x11, 104x11, 106x11, 108x11, 110x11, 112x11, 114x11, 116x11, 118x11, 120x11, 122x11, 124x11, 126x11, 128x11, 130x11, 132x11, 134x11, 136x11, 138x11, 140x11, 142x11, 144x11, 146x11, 148x11, 150x11, 152x11, 154x11, 156x11, 158x11, 160x11, 162x11, 164x11, 166x11, 168x11, 170x11, 172x11, 174x11, 176x11, 178x11, 180x11, 182x11, 184x11, 186x11, 188x11, 190x11, 192x11, 194x11, 196x11, 198x11, 200x11, 202x11, 204x11, 206x11, 208x11, 210x11, 212x11, 214x11, 216x11, 218x11, 220x11, 222x11, 224x11, 226x11, 228x11, 230x11, 232x11, 234x11, 236x11, 238x11, 240x11, 242x11, 244x11, 246x11, 248x11, 250x11, 252x11, 254x11, 256x11, 258x11, 260x11, 262x11, 264x11, 266x11, 268x11, 270x11, 272x11, 274x11, 276x11, 278x11, 280x11, 282x11, 284x11, 286x11, 288x11, 290x11, 292x11, 294x11, 296x11, 298x11, 300x11, 302x11, 304x11, 306x11, 308x11, 310x11, 312x11, 314x11, 316x11, 318x11, 320x11, 322x11, 324x11, 326x11, 328x11, 330x11, 332x11, 334x11, 336x11, 338x11, 340x11, 342x11, 344x11, 346x11, 348x11, 350x11, 352x11, 354x11, 356x11, 358x11, 360x11, 362x11, 364x11, 366x11, 368x11, 370x11, 372x11, 374x11, 376x11, 378x11, 380x11, 382x11, 384x11, 386x11, 388x11, 390x11, 392x11, 394x11, 396x11, 398x11, 400x11.

CRUSHING PLANTS: 25x40 Cedar Rapids Portable, Traylor Power, Others portable & stationary.

BINS & HATCHERS: 70 & 150 yd. 3-comp., Erie Trucks, Florida FWD, International, Etc.

SHOVELS: 60-D Northwest 2½ yd. combination, Link Belt speeder K 580, 3 yd., and others.

DRAGLINES: 6 Yd Walker 145' long, Diesel Loran Model 41 & Crane-Drilling, Diesel.

MISCELLANEOUS ITEMS

Barges, Bins, Buckets, Bolters, Calways, Cars, Compressors, Conveyors, Cranes, Drags, Drills, Elevators, Excavators, Generators, Hoists, Kilns, Draglines, Drag Scrapers, Drills, Engines, Locomotives, Loaders, Motors, Pumps, Pumps, Ball scales, Screens, Shovelings, Shovels, Tanks, Trucks, Tractors, Etc. in most sizes, types and makes at low prices. If you have equipment at many points in the United States and Canada, what you need may be near your plant.

MARIETTA ALEX T. McLEOD KANSAS

FOR SALE

1—Model No. 4111-T224 Austin ½ yard Dragline Powered Buffalo Type 1322

—No. 404 Gasoline Engine.

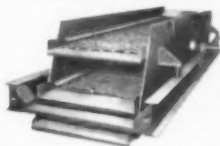
1—New Buda Gasoline Engine, Model HP200, Serial No. 284270—A standby gear used.

Box I-55, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Illinois

Vibrating Screens - Conveyors - Feeders Scales - Crushers - Conveyor Idlers

Guaranteed Equipment—Immediate Shipment

VIBRATING SCREENS

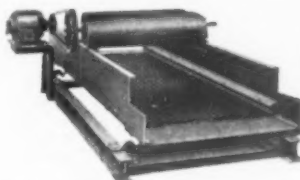


Heavy duty eccentric shaft types 1 to 5 decks, screen sizes to 5x14. Priced from \$1350 including cloth or plate.

CINDER, PUMICE, PERLITE CRUSHERS



10 to 20 tons per hour capacity. \$305.00 25 to 50 tons per hour capacity. \$435.00 Complete with hopper.



Eccentric weight type screens 1 to 3 decks, sizes to 3'x8". Including cloth or plates, from \$395.00.

CONVEYORS - PICKING TABLES



Troughing idler conveyors—picking tables. Any length, belt widths to 60". Prices from \$395.00

HEAVY DUTY FLIGHT CONVEYORS

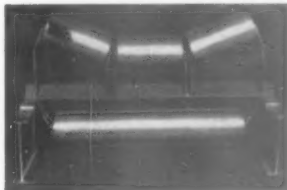
Any length. Flights up to 6'x24". All welded structural and sheet steel. Heavy duty, double guided chain. Prices from \$495.00.

PORTABLE FLIGHT CONVEYORS



Mounted on rubber tires and adjustable undercarriage. All welded structural and sheet steel—double guided heavy duty chain; steel flights to 6'x24". Electric or gasoline power. Priced from \$450.00.

TROUGHING IDLERS AND ROLLERS



FOR SALE

DIESEL POWER PLANTS

6 Complete Diesel Generator Units, 125 KVA Worthington 885, 600 RPM, 3, 60, 230 or 460 V. with Evaporative Condensers, Air Compressor, Switchboard and Silencers. New 1943. Test run only.

1-60 KW, G.M. 6-71RC, 3, 60, 127/220/440, complete. Used only 100 hours.

1-100 KW, Hercules DNX6, 3, 60, 127/220/440. Unit completely enclosed.

WEMCO CLASSIFIER

No. 78 Type SM, spiral classifier, 32' long. Unused, in original crates.

CONTINUOUS ROTARY DRUM FILTERS

8'x6' Oliver, S.S. Type 304, complete with S.S. Receiver and Vacuum Pump. Unused, in original crates.

8'x10', Oliver, with redwood stave shell, complete with Motors, Vacuum Pump and Filtrate Pump.

JEFFREY SWING HAMMER MILL

Type A2, ball bearing, 36" x 24", direct connected to 50 HP, TEFC, motor.

KILNS, DRYERS, COOLERS

3'10" x 16' Link Belt, Rota Louvre.

4'x30' Traylor.

7'x45' x 1/2" Link Belt.

3'x35', 6'x40', 6'5" x 60', 7'x60', 7'x70'.

The above is only a partial listing of our inventory. Send us your inquiries.

Heat and Power Co., Inc.
70 PINE STREET DIOBY 8-0373 NEW YORK 3, N. Y.

TOP PRICES
PAID FOR
SURPLUS
EQUIPMENT

DEPENDABLE USED MACHINES

Special—Eagle bucket loader mounted on Federal truck, dual pneumatics, rear.
Pioneer duplex portable plant
Badger duplex portable plant
Pioneer 30'W washing plant
American 10' x 4' sand pump
Cat. RD-3 with hyd. bulldozer
All above equipment reconditioned in our own plant.

Lima 750 dragline
Berk 61 dragline
Universal truck crane
Several shovel loaders
Eric 8" sand pump

Morris 10" gravel pump
1-4 with front end loader
Case Model L engine
Pioneer ball screen
Bins built to order

10030 S. Ridgeland Ave.

TRACTOR & EQUIPMENT CO.

Oak Lawn, Ill.

FOR SALE

Autocar 5 yard mixer truck.
International K11 tractors and dump trucks suitable for mixer trucks priced \$1500 to \$2500.
International KB810 tractors.
25-ton Fruehauf low boy.
Platform trailers and tank trailers.
Contact

BERMAN SALES COMPANY

R.D. 1 Pennsboro, Penna.
Phone Pennsboro 521

FOR SALE

1 Worthington Heavy Duty Screen 8'x20'
1 Caterpillar Drive Needs Repair
We have a Worthington Superior Jaw Crusher 42" x 40" in excellent condition. Would like to trade for a 6'x36" Jaw.

STOUGHTON CRUSHED STONE CO.
Stoughton, Mass.

RAILS—NEW AND RELAYING CARS—NEW AND USED—ALL TYPES

M. K. FRANK
480 Lexington Ave. Park Building
New York City
105 Lake St. Reno, Nevada

RELAYING RAIL

TRACK ACCESSORIES
MIDWEST STEEL CORPORATION
CHARLESTON 21, W. VA.
KNOXVILLE, TENN. - PORTSMOUTH, VA.

FOR SALE

1-24'x13' Farrel Bacon Jaw Crusher, extra Pitman with wheels, lot of repair parts.
1-75 H.P. Westinghouse Slip Ring Motor, fully equipped with switch, Grid Starter, controller, etc.
1-14'x24' Buchanan Roll Crusher, New shells.

ACME SILICA COMPANY
Flanders, N. J.

FOR SALE

One Diamond STD 4-deck vibrating screen. Almost new. Price \$2,000.00.

A. E. HUDSON COMPANY
120 W. Washington St. Phone 4-9142
East Peoria, Ill.

GAS LOCOMOTIVE CRANE

25 ton cap. Deere gas locomotive crane, serial #3115. Powered with 6 cyl. Cummins gas engine. Boom is 50' long. Good condition. Priced attractively.

ALLSTATES EQUIPMENT CO.
343 S. Dearborn St. Chicago 4, Ill.
Phone: Harrison 7-1821

FOR SALE

Class 24
Bucyrus Dragline
100' boom

LAWRENCE STONE & GRAVEL CO.
Box 454 Columbia, S. C.

FOR SALE

1-Allis Chalmers Type Rotary Kiln.
1-Bonnot 6'x40' Rotary Kiln.
1-Bonnot 3'x35' Rotary Cooler.
1-Williams 4-roll "Comet" High Side Mill.
1-Raymond No. 53 Imp. Mill with 3'x5' Tyler Hammer Screens, 31" bucket elevator and bin.
1-Tyler Hammer Screens, 3'x5', 4'x5', 4'x10'.
1-Jeffrey 30"x24" Type A Hammer Mill with 50 HP motor.
2-Jeffrey 32"x60" Type B Hammer Mills.
1-Williams No. 1 Slagger with 30 HP motor.
2-Williams No. 5, No. 4 Junaco Hammer Mill.
1-Patterson 3'x10' Continuous Ball Mill with air separator.
1-Hardinge 5'x22" Ball Mill with 30 HP motor and classifier.
1-Bonnot 5'x22" steel lined Tube Mill with 150 HP motor.
1-Mares 7'x16' Rod Mill with 200 HP motor.
1-10'x18" Jaw Crusher with 7 1/2 HP motor.

Partial List—Send for Yours. Flash
BRILL EQUIPMENT COMPANY
2401 Third Ave., New York 51, N. Y.

1-20 ton Ray City 10 wheel Truck Crane SP boom, 1946.
1-3/4 Yd. Northwest S&D GM Diesel
1-K70 Link Belt Dragline
1-D7 Bulldozer 4T
1-30 Ton Plymouth Std. Ga. Gas Loco, 1943.
1-70 Ton Plymouth Std. Ga. Diesel Elec. Loco.
1-30 Ton Browning Steam Loco. Crane 1944.
1-30 Ton Orton Diesel Loco. Crane 1941.

B. M. WEISS COMPANY
Girard Trust Co. Bldg.
Philadelphia 12, Pa., Rittenhouse 6-2311

FOR SALE

P&H Model 600 1 1/2 yd. Crawler Shovel. Gas Power. Bargain Price.

EDWARD EHRBAR, INC.
29 Meserole Ave. Brooklyn, N. Y.

New RAILS Relay

Track Accessories—Steel Storage Tanks
W. H. DYER CO., INC.
1859 R Railway Exchange Bldg., St. Louis, Mo.
Stocks at Various Points

FOR SALE

UNIVERSAL TRUCK CRANE on Mark Building chassis, heavy type boom, 5' yard capacity. In good running condition suitable for use within plant. Additional parts including overhauled crane engine. Will deliver.

G. & W. H. CORSON, INC.
Plymouth Meeting, Pa.

FOR SALE

5-2 yd. Blaw-Knox Mixers mounted on BG Marks. In Good Working Condition. Priced Reasonably.

KOLPAK READY MIX CONCRETE
Oregon, Ill., Ph.—Day 267—Evening 919-2

FOR SALE

BOOM for 80' Northwest Shovel, 67' long with Bridge Blocks and Sheaves.

G. & W. H. CORSON, INC.
Plymouth Meeting, Pa.

FOR SALE

Used Truck Mixers For Sale

All late models mounted on trucks and unmounted.

All makes and sizes

from 3 yards to 5½ yards

Both HORIZONTAL and HI-DISCHARGE

50 used late model Jaeger Building Mixers, sizes 6EL, 11EL, 16EL, mounted
2 pneumatic tires. Reconditioned. Immediate delivery.
Prices attractive.

JAEGER-LEMBO MACHINE CORPORATION

127th St. and Northern Blvd.

Corona, L. I., New York

WIRE

PHONE Newtown 9-7777

WRITE



**Need
RAILS?**

*You'll get them
"Faster From Foster"*

**Largest stocks in U.S.
NEW & RELAYING RAILS
Track Tools and Accessories**

Foster guarantees material satisfactory or
returnable freight both ways, our expense.

PIPE • PILING • WIRE ROPE & SLINGS
LEB FOSTER co.

Pittsburgh 30, Pa. New York 7, N.Y.
Chicago 4, Ill. Houston 2, Tex.

FOR SALE — SAND BUSINESS

Complete Electrified Modern Design
Plant and 58 acres of land under
bid with Pennsylvania approved
sand and gravel.

Following are some of the main
items which are placed on concrete
and steel complete with electric
motors.

1. Teismith 3x6 Heavy Duty Feeder
1. Tyler Single Deck Screen
1. Good Roads 10"x20" Crusher
1. Teismith 4x12 2 Deck Screen
1. Teismith 30"x18" Roll Crusher
1. Teismith 2' Cone Crusher
1. Traylor 1st Cone Crusher
1. Teismith Twin Sand Screen
1. 20"x15"—Single Screen
1. Sand Drag 60"x30"
1. 3x10 two deck screen—60" Super
Scraper
7. Conveyors (long Units by Barber
Green)
- Bins—Pumps—Office and Scales—Shov-
els—Trucks, etc.

THE WYOMING NATIONAL BANK
OF WILKES-BARRE
Wilkes-Barre, Pa.



PIPE—Small and
Large Diameter,
from our Stock

Welded
Seamless
Corrugated

Supplies of Fittings
Valves and Tube Turns
Power Piping Fabrication

SPEED-LAY Pipe System
Quick Assembly
Economical, Light Weight

ALBERT
PIPE SUPPLY CO., INC.
Berry at North 13th Sts., Brooklyn 11, N. Y.
Phone EVERgreen 7-8100

COMPLETE BELT CONVEYORS AND CONVEYOR BELTING

COMPLETE ELEVATORS • DRAG CONVEYORS • PAN & RECIPROCATING FEEDERS
ELEVATOR BUCKETS • CONVEYOR PULLEYS

Immediate Delivery

WRITE FOR
LITERATURE

Reduced Prices

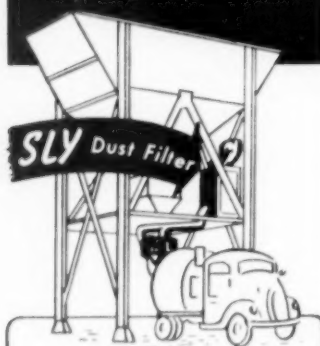
FRANK A. KREMSER AND SONS, INC.

3435-45 NORTH 5th STREET, PHILADELPHIA 40, PENNA.

Regent 9-7272 9-7524

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT
CLASSIFIED ADVERTISING IN CONCRETE PRODUCTS SECTION

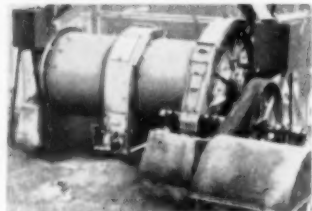
DUST-FREE TRUCK BATCHING



• A Sly Dust Filter will save you the dollars now lost in cement dust and greatly improve working conditions—assures clean truck mixers, clean yard and plant. Pleases the neighbors. Simple, inexpensive, easy to install, economical to operate—a paying investment. Send for Folder 84-H and quotation.

THE W. W. SLY MANUFACTURING CO.
4746 TRIN AVENUE • CLEVELAND 2, OHIO

GET BETTER, CHEAPER SPECIFICATION SANDS



WITH MARCY C-P-D Rod Mills

On Government dam projects and in industrial sand and gravel plants, the New MARCY Center Peripheral Discharge Rod Mills are producing Specification Sands with fineness modulus variations of 0.10.

Other advantages include gradation flexibility, cubical particle shape, and continuity of operation. Write for list of MARCY C-P-D installations on specification sands and full information.

**Mine & Smelter
SUPPLY COMPANY**
DENVER • CLEVELAND • ST. LOUIS • PITTSBURGH • NEW YORK

INDEX TO DISPLAY ADVERTISERS

Allis-Chalmers	19, 47, 65	Kensington Steel Co.	153
Allis-Chalmers (Tractor Div.)	6	Kent Machine Co.	185
American Brake Shoe Co.		Koehring Co.	26, 27
American Manganese Steel Div.	208	Kraft Bag Corp.	74
Electro-Alloys Div.	157	Leschen, A. & Sons Rope Co.	148
Austin-Western Co.	51	LeTourneau, R. G., Inc.	48, 49
Itabock & Wilcox Co.	14	Link Belt Co.	40, 196, 198
Baughman Mfg. Co., Inc.	149, 180	Lippmann Engineering Works	60
Bay City Shovels, Inc.	56	Lith-I-Bar Co.	187
Bemis Bro. Bag Co.	57	Lone Star Cement Corp.	168
Berg Vault Co.	188	McLanahan & Stone Corp.	62
Besser Mfg. Co.	186	Mack Trucks, Inc. Inside Front Cover	
Blaw-Knox Co.	166, 196	Manhattan Rubber Div.	25
Bucyrus-Erie Co.	193	Marion Power Shovel Co.	33
Carnegie-Illinois Steel Corp.	145	Merrick Scale Mfg. Co.	152
Carter-Waters Corp.	190	Mine & Smelter Supply Co.	206
Caterpillar Tractor Co.	10, 11	Multiplex Machinery Corp.	183
Chain Belt Co.	179	Murphy Diesel Co.	141
Chase Bag Co.	76	Naylor Pipe Co.	150
Chevrolet Motor Div.	59	Nordberg Manufacturing Co.	44
Chicago Perforating Co.	198	Northern Blower Co.	24
Chicago Steel Foundry Co.	160	Northwest Engineering Co.	5
Cleveland Vibrator Co.	178	Oliver Corp.	41
Clipper Mfg. Co. Cloth & Mfg. Co.	191	Olsen, Gene, Corp.	188
Columbia Machine Wks.	187	Overstrom & Sons	196
Combustion Engineering-Superheater, Inc.	28, 39	Pennsylvania-Dixie Cement Corp.	185
Concrete Equipment Co.	186, 188	Pettibone Mulliken Corp.	154
Concrete Transport Mixer Co., Inc.	186	Pioneer Engineering Works	31
Continental Gin Co.	50	Plymouth Locomotive Works	58
Davenport Locomotive Works	196	Quaker Rubber Corp.	68
Deister Machine Co.	151	Quinn Wire & Iron Works	198
Demster Bros., Inc.	46	Raybestos-Manhattan, Inc.	25
Detroit Diesel Engine Div.	67	Raymond Pulverizer Div.	28, 39
Dewey & Almy Chemical Co.	36	Resisto-Lov Co.	194
Dix Machinery Mfg. Co.	66	Rock Bit Sales & Service Co.	158
Du Pont, E. I., de Nemours & Co., Inc.	64	Roehling's, John A., Sons Co.	162
Eagle Crusher Co., Inc.	161	Rogers Iron Works Co.	155
Eagle Iron Works	80	Ryerson, Jos. T., & Son, Inc.	152
Easton Car & Construction Co.	3	St. Regis Sales Corp.	43
Eaton Mfg. Co.	53	Sauerman Bros., Inc.	161
Ehrsam, J. R., & Sons Mfg. Co.	199	Scheid Bantam Co.	143
Ensign-Bickford Co.	15	Screen Equipment Co.	146
Erickson Power Lift Trucks, Inc.	186	Signode Steel Strapping Co.	197
Eric Steel Construction Co.	61	Simplicity Engineering Co.	32
Euchel Road Machinery Co.	78	Sly, W. W., Mfg. Co.	206
Farrel-Bacon	159	Smith, F. L., & Co.	70
Fate-Roth-Heath Co.	58	Smith Engineering Works	Inside Back Cover
Federal Motor Truck Co.	137, 138	Smith, Gordon, & Co.	163
Firestone Tire & Rubber Co.	37	Socony-Vacuum Oil Co., Inc.	8, 9
Frog, Switch & Mfg. Co.	162	Stephens-Adams Mfg. Co.	39
Fuller Co.	32	Stulz-Siekles Co.	140
Galigher Co.	207	Sturtevant Mill Co.	195
Gardner-Denver Co.	16	Syntrol Co.	159
Gates Rubber Co.	28	Texas Co.	81
Gatzke, Charles, Mfg. Co.	188	Thermoid Co.	73
Gerlinger Carrier Co.	187	Thew Shovel Co.	42
Goodrich, R. F., Co.	1	Timken Roller Bearing Co.	4
Goodyear Tire & Rubber Co.	1	Trackson Co.	20
	Outside Back Cover	Traylor Engineering & Mfg. Co.	7
Gruendler Crusher & Pulv. Co.	148	Twin City Iron & Wire Co.	198
Gulf Oil Corp.	29	Tyler, W. S., Co.	160
Hammond Bag & Paper Co.	152	Union Bag & Paper Corp.	55
Harnidge Co., Inc.	147	Union Wire Rope Corp.	22, 23
Harnischfeger, P.H., Corp.	45	Unit Crane & Shovel Corp.	182
Hayward Co.	198	U. S. Electrical Motors, Inc.	17, 18
Hetherington & Berner, Inc.	164	U. S. Steel Corp.	145
Hough, Frank G., Co.	69	Universal Engineering Corp.	154
Independent Pneumatic Tool Co.	142	Universal Road Machinery Co.	199
International Harvester Co.	63	Universal Vibrating Screen Co.	182
Iowa Manufacturing Co.	12, 13	Van Ornum Co.	184
Jackson and Church Co.	192	Wellman Engineering Co.	164
Jaeger Machine Co.	165, 181	Western Precipitation Corp.	34
Jeffrey Mfg. Co.	21	Wickwire Spencer Steel Div.	35
Johnston Mfg. Co.	188	Willey, A. R., & Sons, Inc.	198
Jones, W. A., Fdry. & Mach. Co.	194	Williams, C. K., & Co.	176
Kansas City Hay Press Co.	198	Williams Patent Crusher & Pulv. Co.	197
Kennedy-Van Saun Mfg. & Engr. Corp.	34	Worthington Pump & Mach. Corp.	177
		Yuba Mfg. Co.	144

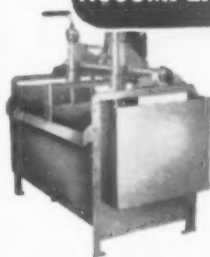
INDEX TO CLASSIFIED ADVERTISERS

Cement Colors	189
Consulting Engineers	205
Core Drilling	205
Equipment Wanted	189, 205
For Sale	189, 199-205
Positions Vacant	189, 205
Positions Wanted	189, 205

ALSO SEE INDEX OF CONCRETE PRODUCTS SECTION ADVERTISERS
ON PAGE 190

Acme Silica Co.	202
Albert Pipe Supply Co., Inc.	203
Allstates Equipment Co.	202
Anna Quarries, Inc.	205
Bacon-Pietsch Co., Inc.	199
Berman Sales Co.	202
Blue Ball Machine Works	205
Bonded Scale and Machine Co.	201
Brill Equipment Co.	202
Brown, Thomas M.	199
Carlyle Rubber Co., Inc.	200
Corson, G. & W. H., Inc.	202
Darien	200
Dyer, W. H., Co., Inc.	202
Ehrbar, Edward, Inc.	202
Eighmy Equipment Co.	205
Foster, L. B., Co.	203
Frank, M. K.	202
Frings, Ray	204
Gibbs, Ralph E.	205
Heat and Power Co., Inc.	202
Heehs, E. D., & Son	199
Heidenreich, E. Lee, Jr.	205
Hodge and Hammond, Inc.	199
Hudson, A. E., Co.	202
Jaeger-Lembo Machine Corp.	203
Johnson and Hoehler, Inc.	201
Kolpak Ready Mix Concrete	202
Kremser, Frank A., & Sons, Inc.	203
Lawrence, Ollie E.	200
Lawrence Stone and Gravel Co.	202
McLeod, Alex T.	201
Mid-Continent Eqt. Co., Inc.	205
Midwest Steel Corp.	202
Mississippi Valley Eqt. Co.	200
Mill and Quarry Eqt. Co.	205
Nussbaum, V. M., & Co.	199
Ohio Hydrate & Supply Co.	199
O'Neill, A. J.	200
Pan-American Engineering Co.	204
Penn. H. O., Machinery Co., Inc.	201
Pennsylvania Drilling Co.	205
Priester Machinery Co.	204
Smith, H. Y., Co.	199
Smith, L. B., Inc.	204
Stiers Bros. Construction Co.	200
Stoughton Crushed Stone Co.	202
Straits Engineering Co.	199
Tractor and Equipment Co.	202
Troyer, Stanley B.	204
Unverzagt, G. A., and Sons	204
Walsh, Richard P., Co.	204
Weiss, B. M., Co.	202
Wyoming Nat'l. Bank of Wilkes-Barre	203
Zenith Dredge Co.	205

ONE MACHINE ... MANY ACCOMPLISHMENTS



Agitair Flotation machines represent the utmost in design flexibility. The Agitair, by simple changes in impeller characteristics, functions efficiently as a rougher, cleaner, or scavenger in both metallic and non-metallic flotation circuits; also handles various degrees of grinding and specific gravities.

Let competent, trained Galigher engineers solve your flotation problems. Agitair Flotation machines, designed and constructed by Galigher, are furnished in standard welded steel construction, or plastic welded steel construction with natural rubber covering parts.

For 35 years the accepted leader — Agitair is designed through experience for the finest in metallurgy. Full information on request.

THE GALIGHER CO.

545 West 8th St. 921 Bergen Ave.
Salt Lake City, Utah Jersey City, N. J.
LEADERS IN EXPERIENCE AND SERVICE

Look for the name
AMSCO[®]
 on the dipper
 you specify...



**Amsco Engineering — plus Amsco Manganese Steel Construction —
 means more efficient, more profitable shovel operation.**

Profit is determined by handling costs per yard, and here are 2 important reasons why you can lower those handling costs with AMSCO Dippers:

Austenitic Manganese Steel—For Longer Life—

The more you use an Amsco dipper, made of manganese steel throughout, the harder it gets! Surfaces that are subject to impact and abrasion actually work-harden and take on a high polish for added wear-resistance.

Manganese Steel—"the toughest steel known"—

withstands the most severe breaking stresses.

AMSCO Engineering—For Better Operation—

Years of Amsco design experience bring you a complete line, from which you can select dippers "custom-engineered" to your own requirements . . . for deep penetration, full loading and positive dumping. Whether you need manganese steel Welded, Missabe, Renewable Lip types, or special designs for unusual service, you'll get longer wearing life and greater economy when you specify Amsco.

NOW! Prompt delivery of Amsco Dippers and Parts

AMSCO[®]

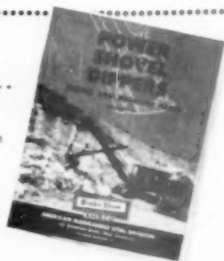
WELDING PRODUCTS

The fast, low-cost way to get worn or damaged equipment back in service.

Amsco hardfacing rods make important on-the-job savings . . . keep down time at a minimum. Contact your supply house or Amsco representative for information on the complete Amsco line of Welding Rod, Weldments and Repointer Bars.

Get the facts on the complete Amsco Line...

This 40-Page booklet is packed with information on Amsco Dippers, and parts for shovels and draglines. Write today for your free copy . . . ask for Bulletin No. 517 DS.



AMERICAN

Brake Shoe

COMPANY

AMERICAN MANGANESE STEEL DIVISION

377 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

The New TELSMITH GYRASPHERE Crushers...



Send for
Bulletin
No. 274

TWO *new* MODELS Style S—Standard Style FC—Fine Crushing

Style S—Standard Gyrasphere has—

1. Longer Crushing Stroke giving greater capacity.
2. Larger Roller Thrust Bearings, both now located at top of eccentric.
3. More Eccentric Bearing Area in upper crushing zone.
4. Longer Springs to pass larger tramp iron.
5. New Location of Drive Gears for more economical operation.
6. Easier Accessibility for lower maintenance.
7. Available with either coarse or medium bowl.

Style FC—Fine Crushing Gyrasphere has these additional improvements—

1. New Feed Distributor for even feeding and a more uniform product.
2. Different Shape of Mantle and Concave with longer parallel crushing zone for finer product.
3. New Gun-Lock type mantle and concave holding devices — automatically self-tightening, easier to change.
4. More Springs for greater crushing pressures.
5. Available with either medium or fine bowl.

Y-1

SMITH ENGINEERING WORKS, 508 EAST CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Address: Sengworks, Milwaukee

51 East 42nd St. New York 17, N.Y. • 211 W. Wacker Dr. Chicago 6, Ill. • 713 Commercial Trust Bldg. Philadelphia 2, Pa. • 238 Main Street Cambridge 42, Mass. • Roehrk Eght. Co. Milwaukee 3, Wis. • Brandeis Machinery & Supply Co. Louisville 8, Ky. & Evansville, Ind. • Clyde Equipment Co., Portland 9, Ore. & Seattle 4, Wash. • Mines Eng. & Eght. Co., San Francisco 4, Calif. • Interstate Equipment Co., Statesville, N. C. • Rish Equipment Co., Charleston 22 & Clarksburg, W. Va. • Roanoke 7 & Richmond 19, Va. • Wilson-Weesner-Wilkinson Co., Knoxville 8 & Nashville 6, Tenn.

2 ways to Better Air Service

GOODYEAR INDUSTRIAL RUBBER PRODUCTS

G.I.P. -Specified EMERALD CORD AIR HOSE for ALL HEAVY-DUTY TYPES OF AIR SERVICE



- A—Super-tough, non-gauging green cover
- B—Reinforcement of high-strength cord impregnated with "Adhezo" for greatest strength, best adhesion, reduced wall gauge
- C—Non-porous, seamless, oil-resistant, non-flaking tube

Emerald Cord Air Hose is made with one, two or three braids depending on severity of service—is the finest air hose available anywhere.

GOODYEAR INDUSTRIAL RUBBER PRODUCTS

G.I.P. -Specified REDWING-H CORD AIR HOSE for MINES, QUARRIES, CONSTRUCTION JOBS (direct connection to compressors, etc.)



- A—Rugged red cover of "cushiony" rubber stock
- B—Rayon cord braids for strength and resistance to shock blows
- C—Non-porous, seamless, oil-resistant tube will not flake

FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

For the best service at the lowest cost in the long run, ask the G.T.M.—Goodyear Technical Man—for either of these pace-setting hoses. Emerald Cord is the finest air

hose made—Redwing-H Cord gives high quality at a lower price. To consult the G.T.M., phone your nearest Goodyear Distributor, or write Goodyear, Akron 16, Ohio.

GOOD YEAR

THE GREATEST NAME IN RUBBER

Emerald Cord, Redwing-H T.M. is the Goodyear Tire & Rubber Company